Service Bulletin

BKSB-1093
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Issue: BKR0102 & BKR0102-100 Li-Ion batteries will not charge after deep discharge.

Importance: High

Affected Models: BKR0102 & BKR0102-100 Li-Ion batteries.

Recommended Action: Upgrade the battery characteristic file to rev 13. (Most batteries are rev 5 or 7). The battery upgrade is accomplished by simply inserting a battery into a BKR0303-2 DUC (Dual Unit Charger) that has been upgraded to Firmware revision 3.0.23. See General Instructions below for more detail.

**Required:** BKR0721 CFP (Charger Field Programmer) with FW 3.0.23 loaded.

General Instructions:

The BKR0102 Li-Ion battery was designed to be charged fully and discharged fully. Occasionally, with earlier vintage battery characteristic files and radio FW, the battery can be discharged to below the Under Voltage Protection (UVP) threshold and the battery can no longer be charged. The earlier battery characteristics files (rev 5 or rev 7) had insufficient margins to the UVP thresholds and combined with radio FW revisions (<rev.36) the batteries could become unrecoverable. The correction to this issue is:

- Update BKR9000 radio FW to rev .36 (See [BKSB-1092](#))

- Update BKR0303-2 charger FW to 3.0.23

    - Charger FW can be easily updated through the use of BKR0721 CFP with the 3.0.23 programming loaded.

- Update BKR0102 battery characteristic files by inserting any BKR0102 battery of any characteristic file revision into a BKR0303-2 charger that has been updated to FW rev 3.0.23

    - The BKR0303-2 charger with 3.0.23 FW will communicate with the BKR0102 battery and update the characteristic file to rev 13.

        - Normally, when the BKR0102 battery is placed in the BKR0303-2 charger, the LED litepipe flashes yellow 2-3 times as the charger acknowledges the battery.

        - The first time that a BKR0102 battery (with earlier vintage characteristic file) is placed in the BKR0303-2 charger pocket, after the charger has been updated to 3.0.23 FW, the LED litepipe will flash yellow 4-7 times while the battery characteristic file is being updated.

            - If the communication is interrupted for any reason, simply remove the

battery and reinsert. If the LED flashes yellow 2-3 times, then the battery update has been completed. If the LED flashes 4-7 times then battery characteristic file is being updated.

- o The characteristic file (or INI Ver) can be identified by placing the battery on a BKR9000 radio with the .36 FW.

    - In the menu, enter System Test

    - In System Test, enter Battery Statistics

    - The revision of the battery characteristic file (INI Ver) is shown as below:
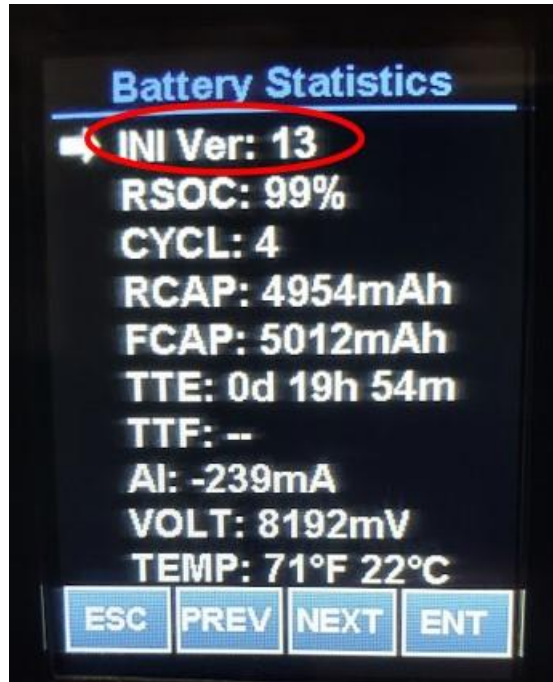
The BKR0303-2 DUC FW can be upgraded to FW 3.0.23 simply by inserting the BKR0721 CFP with the 3.0.23FW preprogrammed in the CFP.

Using the BKR0721 CFP to program BKR0303-2 DUC:

- BKR0721 CFP Usage Best Practices:
    - Dry Location Use ONLY
    - Indoor Use ONLY
    - Recommend using ESD best practices (e.g. using an ESD Ground Strap) when programming
    - Recommend NOT transmitting radio in immediate proximity while programming

- BKR0721 CFP requires 3-AAA Alkaline Batteries; Alkaline Batteries ONLY
    - DO NOT use other chemistry batteries, e.g. Li-Ion, Zinc-chloride, or NiMH.
    - INSTALL in the correct orientation
        - Cell orientation is indicated on the Cell Tray
        - Incorrectly installed battery will not power the CFP; the cell tray has mechanical features that prevent reverse polarity to the CFP which could otherwise damage the CFP
- Once the 3-AAA batteries are installed <correctly>, the BKR0721 CFP will provide the following LED indications (CFP Power-Up Initialization):

- o Both the Programming and Power Status LEDs will cycle through Solid RED, Solid YELLOW, Solid GREEN for ~14 seconds (~2.25-sec each color, and then repeated once, for a total of 2-times) and then go OFF to save power
  - Note, by the time it takes to add the 3rd battery, install the cover, and flip the unit over, you may only see 1-cycle of the Programming and Power Status LEDs going through Solid RED, Solid YELLOW, Solid GREEN

- Additional battery installation notes:
  - o If the installed batteries are not new, e.g., if the resultant power is approx. between 3.75 and 4V, once the BKR0721 CFP goes through its initialization sequence, then Power Status will show Solid Yellow
    - This state indicates that the BKR0721 CFP is still usable, but has Low Power
  - o If the installed batteries are not new, e.g., if the resultant power is approx. between 3.6 and 3.75V, once the BKR0721 CFP goes through its initialization sequence, then Power Status will show Solid Red
    - This state indicates that the BKR0721 CFP is not usable, and batteries will need to be replaced
      - The BKR0721 CFP LED will indicate Solid Red until BKR0721 CFP SW Shutdown threshold is met (~<3.6V), and then turn OFF
  - o If the installed batteries are not new, e.g. if the resultant power is < 3.6V the BKR0721 CFP goes through its initialization sequence, then Power Status will "quickly" show Solid Yellow, Solid Red, and then OFF
    - This state indicates that the BKR0721 CFP batteries are DEAD and need to be replaced
  - o Approx. every 15-minutes, the BKR0721 CFP re-assesses Power Status, and provides a new indication (if necessary)
  - o Once the Low Power Thresholds are met (either Solid Yellow and/or Solid Red), the BKR0721 CFP will maintain that indication(s) thru the remaining life of the product

- Programming
  - o Target device/charger (BKR0303-2 DUC) that is being reprogrammed MUST be powered through its External PSU
  - o The BKR0303-2 DUC is only reprogrammable via Pocket -0- or its Priority Pocket
    - The DUC has an indication (insert molded symbol) designating the priority pocket
      - The **P**riority Pocket has a molded in 'square" in the floor of the pocket; the **S**econdary Pocket has a 'circle' molded into the floor of the pocket

  - o Programming LED Indications once installed in a Pocket:

- Solid Yellow indicates to the user the Portable Field Programmer is programming the charger
- Solid Green indicates charger/pocket has programmed successful
    - IMPORTANT NOTE: Once the target device indicates that it has successfully been reprogrammed (Solid GREEN LED), it is imperative that the reprogrammed charger is power cycled to complete/initiate the software update
- Solid Red indicates charger/pocket programmed unsuccessful
    - Note, the Solid Green or Solid Red LED will be maintained until the Portable Field Programmer is removed from the charger to address the use case in which the user is distracted or leaves their station
- Additionally, if "programming" (Solid Yellow) and the CFP is either removed or the charger powers OFF, then the Programming LED will show Solid Red (transition from Solid Yellow to Solid Red) and maintain that indication until the CFP is reinserted into a charger or the charger is powered up again
- Note, programming takes less that 10-sec to complete

- Battery Life
    - Even under heavy use, i.e., continuously programming a charger, > 5-days of battery life is possible, so light use should experience a long battery life
        - However, for optimal product life, it is recommended that the CFP is NOT left in the Charger Pocket as the LED Indication (either Green or Red will be left ON) will tax the battery life
            - Again, noting that the Solid Green or Solid Red LED will be maintained until the Portable Field Programmer is removed from the charger to address the use case in which the user is distracted or leaves their station.