

# DCM Firmware Release Notes 4.13

[#### ] = internal reference number

## Released Version 4.13

- [2466] It is recommended to pre-load the release before taking resistance readings for the first jar in each load group.
- [2468] The pre-load time has been extended to 30 seconds for internal resistance in a dual resistance test.
- [2475] DCM now uses a new resistance algorithm when a model number is between 1003 and 1010.
- [2476] If a discharge is detected on the system, the resistance test will be interrupted and will not run.
- [2516] Scan mode has been changed to add intertier voltage back to combined readings.
- [2522] Switch 1, DIP 8 which was used to address pre-load, is no longer used as an address switch.

## Released Version 4.09

- [2409] Added DIP switch-7 to make firmware compatible with 1003-xxx hardware and later versions.

## Released Version 3.45

- [2393] Improved the intercell dual reading resistance test to include intercell number 48.

## Released Version 3.43

- [2385] Improved intertier resistance repeatability.

## Released Version 3.41

- [2324] Improved the single diagnostics resistance test by adding specific parameters to eliminate possible timeouts during testing.
- [2287] Improved battery setup by adding specific parameters that help prevent the input of incorrect battery setup information.
- [2275] Increased number of resistance samples from 144 to 255 for extended intertier testing.
- [2274] Improved resistance test by checking polarity of loaded and unloaded voltages.

## Released Version 3.37

- [2219] Added support for negative cell voltages.
- [2217] Added support for 16 Volt modules.
- [2205] Improved accuracy on cell resistance values on intertiers.
- [2204] Improved resistance test by eliminating phantom cell resistance readings.

**Released Version 3.33**

- [2200] Cell voltage number 38 data is now updated and displayed accurately.
- [2191] Improved extended intertier test to avoid cell resistance data overflow.
- [2184] Added the ability to refresh Calibration Constants from E2 to SRAM before initiating a Resistance test.
- [2177] Added the ability to check the firmware running status even if the DCM is running from PROM.

**Released Version 3.29**

Added these features to the discrete resistance test:

If the reading is out of preset range, then it retests cell resistance 4 times.

- [2166] Baseline check in average internal resistance test.  
A cell resistance extend average test to average 16 times in the cell extend mode.  
A resistance test mode and cool down time between load steps.

**Released Version 3.27**

- [2129] Improved discharge data collection.
- [2121] Added new single resistance test modes (total of 8) and cool down times between load steps.
- [2100] Added a new cell resistance extend average test. It will average 16 times in cell extend mode.
- [2098] Improved the accuracy of internal resistance tests to be less susceptible to noise.
- [2097] Improved accuracy of readings by eliminating a potential timing violation.
- [2096] Improved timing in discharge playback to prevent lagging.
- [2089] If the cell resistance value is out of baseline range, then the DCM will redo the cell resistance test 4 times. [2081]
- [2088] Increased the buffer size to accommodate the intertier extended average test.
- [2085] Improved DCM communication/timing during resistance test to be more robust and reliable.  
If the cell resistance value is out of baseline range, then the DCM will redo the cell resistance test 3 times on a regular resistance test and 2 times on an average resistance test.
- [2081]
- [2065] The two highest and two lowest readings in resistance average test have been dropped in the algorithm for better averaging results.

**Released Version 3.17**

- [2014] In diagnostic mode, DCM checks discharge raw counts when they are less than 15.

**Released Version 3.15**

- [1995] Now, checks discharge during resistance test cool down time to improve discharge detection during resistance tests.
- [1977] Now, confirms increased frequency of discharge for the sampling of every five cells.

**Released Version 3.13**

[1986] Fixed bad readings in resistance tests.

**Released Version 3.11**

[1941] Added support for the new hardware with 512 kbits memory chip.

**Released Version 3.09**

[1923] BDS-40 now ignores the DIP switch setting for DCM and is always set to DCM 1.

[1906] High String current alarm now functions properly.

**Released Version 3.08**

[1845] Added function to check string current high alarm.

[1816] DCM calibration timeout is now based on communication instead of time.

[1782] Alarm disable after a resistance test is no longer controlled in the DCM. The Controller firmware controls this function.

[1781] Alarm disable after a discharge is no longer controlled in the DCM. The Controller firmware controls this function.

[1733] Can now store the model number and serial number in memory.

[1672] 50/60hz selection can now be done via software.

[1593] Added a reboot command that is executed every time the Controller is reset. This ensures the DCM is not latched in a special mode after Controller reboot.

[1568] A new algorithm speeds up the discharge data collection process.

**Released Version 3.05**

[1615] When taking cell resistance with intertier assigned, DCM now calculates the average from 8 readings.

[1595] No longer loses communication after some auto-resistance tests.

[1580] Fixed alarm recovery by decreasing hysteresis for temperature alarms.

[1565] Now shows float current on new DCM boards. The flag for existing float current is now updated after battery setup.

**Released Version 3.01**

[1507] Added extended intertier average test. This improves intertier resistance testing in noisy environments for BDS units.

[1465] DCM clears data buffer for all alarms before starts resistance test.

**Released Version 2.54**

[1408] The cool down delay for the Diagnostics test in dual mode has been disabled.

[1407] In dual mode, the intertier resistance readings were showing 32000. Test current was overflowing in the code because of a wrong register definition.

[1399] The DCM now correctly reports resistance alarms. The code for the alarm counter has been changed to more accurately detect alarms.

**Released Version 2.53**

- [1382] Resolution improved for tracking temperature variation.
- [1041] The calculated temperature displayed is now linear and meets product specs. The problem was in how the K factor was being calculated.
- [1370] Test current and cell channels are no longer on at the same time during a resistance test.
- [999] Readings are compensated to adjust auto null offset of test current input when an ELM with a CT is used. (DIP SW 6 of bank 2.)

**Released Version 2.51**

- [1365] Overall Voltage assignments are removed in DCMs other than DCM #1 when battery setup is sent. 'Cell scan' flag is checked before calculating overall voltage in the BDS-40.

**Released Version 2.49**

- [1313] If signature AAH is set at address FF64H, window 3650 - 100 instead of 4096 - 100 is used to check cell connection. (Raw counts.)
- [1312] Reduced the cell voltage calibration constant by half to eliminate overflow. Cell voltage and resistance algorithms have been adjusted to keep readings compatible with older versions.
- [1303] DCM accepts a 12V cell calibration factor of 0.0044, to support lower input voltages in hardware to extend measurement headroom.

**Released Version 2.48**

- [1304] The Mux enable line was enabled for the entire resistance test, resulting in incorrect resistance readings and possible equipment damage. Now mux enable is activated 20-25mS after the address is sent.

**Released Version 2.47**

- [1279] Stopped false float current alarms when float current is not assigned on a DCM.
- [1278] DCM sends back the correct status for cell connection.
- [1198] DCM address check for DCM-40 flashes two quick flashes, counts the string number, then loops.
- [1109] A one-hour timer is implemented in the DCM to resume scan.

**Released Version 2.46**

- [1249] Single or multi board status is now checked before turning off temperature power. If it is a single board, temperature power is turned off after getting each temperature reading. Temperature power is now turned off during a resistance test.
- [1248] If the total cell number of the string is less than 40, the cool down time for an internal resistance test is 5 minutes instead of 10 seconds between load steps.
- [1215] On the BDS-40, during check cell voltage, if the raw count equals 4096 or less than 100, the R test, load diagnostic, and test current calibration is disabled.
- [1197] The firmware now locks on the channel during BDS-40 calibration.

**Released Version 2.44 (was 2.50)**

- [1231] The user now sends calibration constants after sending battery setup, to ensure the calibration constants are correct.
- [1133] A 10ms delay has been added before taking a reading from the A/D.
- [1128] The BDS-40 firmware will calculate overall voltage if a signature is found. Otherwise, the overall voltage is from the A/D converter.
- [1127] D6 of ports C is now cleared after sending address to parameters channel to get readings. D6 is set to "1" after the reading is taken.
- [939] An alarm counter has been added for each parameter, to qualify alarms with five consecutive readings.
- [716] Can now assign more than five intertiers to a DCM.
- [1073] The Temperature Enable line is now inactive after getting a temperature reading.
- [1019] The cool down time for an Average test is now 11 minutes.
- [1018] Intertier tests are now averaged eight times instead of five.
- [770] A calibration constant is now available for each voltage mode of 2V, 4V, 8V and 12V. This simplifies production by not having to calibrate to order. The five calibration constants are stored in EEPROM and are updated only after receiving a command to set calibration. These constants are only for backup. Resending calibration constants after upgrading firmware is not needed.

**Version 2.41**

- Extend the cool down time to 10 minutes.

**Version 2.39a0**

- Qualify alarm with five consecutive readings. Add an alarm counter for each parameter.

**Version 2.38**

- Cool down time between DCM during resistance test is now 10 minutes (was 5 minutes) when set to averaging mode.

**Version 2.37**

- Dipswitch 2, position 8 will now make firmware run from PROM (Clear Flash).
- Implement software data protection for Flash chip to protect against corrupted code.
- Multi board hardware EE2 chip select is pinged as if new board EE2 watch dog timer. On some boards this causes diagnostics and check settings to not operate. After this symptom happens firmware cannot be upgraded. Flash chip must manually be changed with programmed one of previous version.
- Correct Float current polarity bit.

**Version 2.33**

- Fixed intercell resistance readings returning a value too high.

**Version 2.31**

- Function for averaging intertiers during a resistance test is controlled by position 4 of the DIP switch.
- No longer get invalid readings for intercell or intertier readings.
- Added support for new External Load Module for UL certification. Position 6 of the DIP switch should be ON for new board.
- Corrected some timing issues that dealt with some differences in hardware components.
- Add intertier voltage to cell voltage when Monitor Load Control is doing a load test.
- Added support for new DCM processor for UL certification. This included the following:
  - a - Automatic selection of gain circuits for specific cell voltages.
  - b - Support 16 bit serial EEPROM
  - c - Poll LED to identify when DCM is being addressed.
  - d - Support float current transducers.

**Version 2.28**

- Implemented new communications protocol between Controller and DCM's. This will improve the reliability of the communications.
- Some DCM's would not report resistance values during an automatic timed test. This is now resolved.
- Added a five minute cool down time after doing average test and intercell test. On large systems, this allowed the load module to cool down during resistance test.

**Version 2.18 and 2.17**

- When making intercell measurements, the readings are now averaged to compensate for noisy systems.

**Version 2.16**

- Never released.

## Version 2.15

- The second alarm on each DCM can now be reset properly.
- Cells that now have an intertier assigned will process the alarm properly.
- Activate alarm relay on both multiplexer boards during a resistance test. This relay is used to isolate power and ground to the temperature probe.
- Improved performance of external load module.
- DCM's now support intercell readings. The DIP switch on the DCM must be configured properly. This switch will be set from the factory.
- DCM Switch 2/2 = Gain Control
- Closed = Old DCM or new DCM w/dual readings.
- IC = hi gain
- IT = low gain
- Gain resistors installed are the same as old DCM configurations.
- Open = New DCM with single readings only.
- IT (R test) = High Gain
- IT (Discharge) = Low Gain
- DCM Switch 2/3 = Single/Dual Mode
- Closed = Single
- Subtract IT during resistance test and add IT voltage during discharge.
- Intertier assignment remains as independent channels:
- IT 1-5 = IC channel 25 - 29
- IT 6-10 = IC channel 55 - 59
- Open = Dual
- No adding or subtracting of intertiers.
- Intertier assignment is intercell channel adjacent to cell that has intertier assigned.
- Up to 10 intertier alarm thresholds can now be set. Previously only one could be set.
- The % of warning for resistance alarms is now functioning.
- Cell voltage and OV discharge thresholds now work for detecting problem discharges.