Application Note

BQ40Z50-R4 to BQ40Z50-R5 Change List

ABSTRACT

This document describes the changes made from the BQ40Z50-R4 device to the BQ40Z50-R5 firmware. This change list also describes changes made to the BQ40Z50-R5 firmware versions released. The latest ordering information and the *BQ40Z50-R5 Technical Reference Manual* are available on TI.com.

1 Introduction

The BQ40Z50-R5 firmware enables several feature additions and performance improvements on the previous versions of the BQ40Z50 firmware.

To work with BQ40Z50-R5, download the latest version of the Battery Management Studio (BQSTUDIO) evaluation software from TI.com.

The existing BQ40Z50, BQ40Z50-R1, BQ40Z50-R2, BQ40Z50-R3, and BQ40Z50-R4 integrated circuits and evaluation modules (EVMs) can be upgraded to BQ40Z50-R5 firmware by downloading the .srec firmware file from TI.com.

2 Change Details

Change Details shows the changes from the BQ40Z50-R4 device to the BQ40Z50-R5 device.

Table 2-1. Change Details

Change Description	BQ40Z50-R5	BQ40Z50-R4	Comments
Enabled CHG FET to turn off in SLEEP mode, even if [PRES] = 1	Expanded feature	***FET Options[SLEEPCHG]*** now applies to in-system SLEEP mode.	Enables the option to reduce power consumption in SLEEP mode for integrated battery packs.
Updated the voltage based cell balancing algorithm when the device is in REST mode	New feature	Feature does not exist.	Enables voltage based cell balancing operation to continue after the device enters REST mode.
Added voltage or RSOC Option for C-Rate transitions in Advanced Charge Algorithm	New feature	Feature does not exist.	Enables a C-Rate stepdown to be based on voltage or RSOC so an aged battery with lower voltage at the same RSOC level can step down the C-rate earlier.
Changed the Turbo Cfg C-rate entry unit from 0.1°C to 0.01°C	Modified feature	Less resolution with TURBO mode parameters	Enables customers to enter a decimal c-rate value during TURBO mode to reduce power loss due to rounded down c-rate.
Added cycle count stamp to Black Box event under Lifetimes DF	New feature	Feature does not exist.	Helps to reduce system debug effort when debugging safety or PF events.
Added a programmable temp range for Lifetime RSOC-Temp recording	New feature	Feature does not exist.	Enables customers to record RSOC with increase granularity at a higher temperature, because temperature effects are exponential at a higher temperature.
Added an unseal key when writing to Manufacturing Info Block C during SEAL mode	New feature	Feature does not exist.	Provides additional data override protection for Manufacturing Info Block C.
Added a threshold to temperature delta between cells	New feature	Feature does not exist.	Prevents a serious temperature gap between adjacent cells, which can lead to a cell imbalance and other serious issues.
Added the EVLTM/EVMTM/EVHTM time tracking and five cell voltage stepdowns	New feature	Feature does not exist.	To better control CV due to cell aging, the ERETM function is expanded to provide more voltage steps down due to increasing temperature.

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Table 2-1. Change Details (continued)

Change Description	BQ40Z50-R5	BQ40Z50-R4	Comments
Added ***[SLOW CRATE]*** option to slow down current change rate by 5 times.	Modified feature	Feature does not exist.	Slows down the current transistion by multiplying the ***Current Rate*** by 5, effectively making the current step size smaller, and taking 5 times as many 1-second steps to transistion to the target *ChargingCurrent()*.
Added Low RSOC time-based shutdown	New feature	Feature does not exist.	Allows automatic Time-Based Shutdown after a low RSOC condition is detected.
Added STORAGE Mode activation feature	New feature	Feature does not exist.	Addtional low power option while in SLEEP which disables the CHG and DSG FETs. Enables device wake up by pressing a button to pull SMBus lines high.
Added functionality to prevent flash wearout when writing to MAC 0x00B0 and 0x00B2 commands	New Feature	Feature does not exist.	The feature is to prevent over-usage of the MAC 0x00B0 and 0x00B2 commands from causing severe data flash wear by introducing the ***Sealed Write.Hold Off*** and the ***Sealed Write.Lockout*** parameters. The ***Sealed Write.Hold Off*** parameter sets the delay time before new values are written to the data flash, and the ***Sealed Write.Lockout*** parameter sets the period of lockout time before a new value can again be written to the data flash after the previous write.
Enabled the *ChargingCurrent()* to be lower than ***Pre-Charging:Current*** if desired	Modified feature	Prevented the *ChargingCurrent()* from going to a JEITA setting which is < ***Pre-Charging:Current***	This feature helps to prevent the charging degradation algorithm from reducing and causing the *ChargingCurrent()* to fall below ***Pre-Charging:Current***. The corrected implementation now allows the *ChargingCurrent()* to take on a JEITA setting that is < ***Pre-Charging:Current*** even if the charge degradation iss enabled.
Fixed LStatus and Balance Status registers in the BQStudio configuration file to display properly on the main Bit Registers page	Modified feature	Registers are mapped as integers instead of hex.	Changed mapping to hex: LStatus and Balance Status were mapped as integers instead of hex in the previous releases, which led to the incorrect bits labeled as active in the BQStudio register display. BQ40Z50-R5 corrects this issue.

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3 Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

DATE	REVISION	NOTES
January 2023	*	Initial Release

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