

bq40z50-R1 to bq40z50-R2 Change List

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ABSTRACT

This document describes the changes made from bq40z50-R1 to bq40z50-R2. The latest ordering information and data sheet is available on TI.com.

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1 Introduction

bq40z50-R2 firmware version 2.08 has been released to enable several feature additions and performance improvements. The following new orderable part numbers have been released which ship pre-programmed with this new version of firmware:

- bq40z50RSMT-R2
- bq40z50RSMR-R2

To work with bq40z50-R2, download the latest version of the [Battery Management Studio](#) (bqStudio) evaluation software from TI.com.

The existing bq40z50 and bq40z50-R1 integrated circuits and evaluation modules (EVMs) can be upgraded to bq40z50-R2 FW by downloading the .srec firmware file for v2.08 from TI.com.

2 Change Details

Table 1. Change Details

CHANGE HIGH-LEVEL DESCRIPTION	bq40z50-R2	bq40z50-R1	COMMENTS
Turbo Mode 2.0	New feature	Feature does not exist	New feature to implement Intel DBPT2 for 10 ms and 10-s power and current calculation
Disable EMShut	New feature	Feature does not exist	Disable EMShut exit through SHUTDOWN pin transition
LED display of permanent failures (PF) only	New feature	Feature does not exist	New option [LEDPF1/LEDPF0 = 1/0] to display PF error code only without displaying state of charge (SOC) in PF state
Prevent unintended wakeup from shutdown	Added an option to prevent unintended wakeup from shutdown	Bug fix	If enabled, [CheckWakeUp] manages a shutdown of the gauge by any allowed shutdown process (except for voltage-based shutdown and power save shutdown, both of which are excluded from this feature).
Add five new PFs	Added new five PFs for COVL, OCDL, OLDL, SCCL, and SCDL	Feature does not exist	These five new PFs have a latch count or a latch limit to generate PFs
Cycle count and state-of-health (SoH) based charging voltage and charging current	Added cycle count or SoH-based degradation on chg V/I	Feature does not exist	In charging configuration, [CYCLE_DEGRADE] selects cycle-count based degradation and [SOH_DEGRADE] selects SOH-based degradation. The charging voltage degrades by default. Setting [DEGRADE_CC] creates charging current degradation in addition to charging voltage degradation.
Smoothing in charge direction	Smoothing in charge direction	Feature does not exist	This feature smooths the remaining capacity and can be enabled by [Chg_100_SMOOTH_OK]
LED functionality during CUV events	New feature	Feature does not exist	New option [LEDIFCUV] to have light-emitting diode (LED) functionality during CUV
OCD, OCC, PCHGOC recovery time in sleep mode	Checked every second	Checked every sleep voltage time	The safety check function is called every second in sleep mode. This feature cannot be disabled.
PF status – temperature range and charging status written to 0	New feature	Feature does not exist	After a PF occurs, the temperature range and charging status stop reporting the ranges they are in.
ResRelaxTime should be decreased	Default value changed to 50	Default value was 500	Did not reflect the automatic scaling in low temperature

Table 1. Change Details (continued)

CHANGE HIGH-LEVEL DESCRIPTION	bq40z50-R2	bq40z50-R1	COMMENTS
Enable for SHA-1 use of secure memory	Security improvement	—	—
Cell IR drop compensation scheme	Added cell Interconnect IR compensation scheme to prevent premature cell end-of-discharge-voltage (EDV) detection	Algorithm improvement	This feature can be enabled by [CELL_INTER_IR]
International Air Transport Association (IATA)	New feature	Feature does not exist	Added IATA support following IATA specification 3.10
RSOC write command	Relative state-of-charge (RSOC) write MAC command, command 0x79	Feature does not exist	Using the MAC command, the desired RSOC value is loaded and the RemCap value is calculated using current FCC. The calculated RemCap value is used in smoothed RemCap.
Parallel cell balancing	New feature	Feature does not exist	Enable parallel balancing option [CBM]. The adjacent cells will not be balanced.
Remove the open-cell PF feature	Feature removed	Feature exists [OPNCELL]	Feature did not work properly
Temperature used by impedance track (IT) should be selectable	Feature update	Algorithm used average temperature	Add an option to select a temperature from min, max, and avg for IT. The temperature selection can be done by setting TS1/TS0 in IT gauging Ext configuration with the following setting: (MAX:0 AVG:1, MIN:2).
Compensation for IR drop in the battery management unit (BMU)	Adjusts for system IR drop in charging voltage	Algorithm improvement	Added compensation for IR drop by enabling [COMP_IR] in charging configuration. Configurable system resistance compensates system-level IR drop.
LED blinking option for SOC	Allows an option to blink from the mid-point to segment end	Feature does not exist	Provides an ability to display mid-point of each SOC thresholds by setting [BLINKMIDPT] in LED configuration
Cell balancing in sleep	Allow battery discharge option in long-term storage	Feature does not exist	Added an option to enable cell balancing in sleep [CBS] Entry condition 1: Sleep time is over [StartTimeForSleepBal] Entry condition 2: RSOC is over [StartRsocForSleepBal] Both conditions should meet to enter balancing Exit condition: RSOC is under [EndRsocForSleepBal]
LED option to remain solid ON	After full charge (FC), LED to remain ON	Feature does not exist	Add an option to have LED stay solid ON after charging completes. Even after charging completion, if [LEDONFC] is set, the LED is ON for the LED timer [LEDFCTIME] period, which is 15-m units.
Minimum cell temp selection option for SBS.temperature()	Feature update	—	Add an option to determine what SBS.temperature() displays. Min temp option has been added. Now [CTEMP] is the 2-bit option. (0:max temp, 1:avg temp, 2:min temp)
Enable Rscale at high depth of discharge (DOD)	Apply Rscale at DOD higher than where Rscale is calculated	Feature does not exist	To enable, set [DOD_RSCALE_EN] in IT gauging configuration.
Allow reported capacity update in sleep	LEDs must show updated capacity even in sleep mode	—	—
Create separate constant current (CC) and constant voltage (CV) registers for standard temperature low (STL) and standard temperature high (STH)	Flexibility in setting CC and CV for different temp ranges	Feature does not exist	Standard temperature ranges separated into standard low and high temperatures. Having the same default chg V/I on the STL and STH ranges maintains backward compatibility with -R1.
Additional means of EMShut abort	Two new options to abort EMShut	Feature update	When the Power Config [EMSHUT_EXIT_VPACK] is set, the device exits from [EMSHUT] condition if a charger is present. The charger presence is detected by a Vpack above the charger present threshold for 2 s. When the Power Config [EMSHUT_EXIT_COMM] is set, the device exits from [EMSHUT] if any communication activity occurs, instead of only when the MFC_DISABLE MAC subcommand is sent.
RSOC Round-off option	This option allows flexibility to adjust to different systems	Feature does not exist	Added [RSOC_RND_OFF] in gauging configuration [RSOC_RND_OFF] = 0: ceiling function is used as before [RSOC_RND_OFF] = 1: Round off the RSOC except RSOC is between 99% to 99.99% If RSOC is between 99% to 99.99%, RSOC round-down applies
Option to set cell temperature based on SMBus™ command	This option allows systems to set temperature by MAC command	Feature does not exist	New data flash (DF) setting [SMB_CELL_TEMP] enables the feature. If [SMB_CELL_TEMP] = 1, the new MAC command (0x3008) writes the new temperature.
Option for additional charging voltage degradation (to help prevent and reduce cell swelling)	This option allows systems to try to reduce cell swelling by reducing charging voltage	Feature does not exist	Add an additional charging voltage degradation. The CV degradation is based on the cell temperature and cell voltage. New DF [CS_CV] in the charging configuration enables the feature If temperature and voltage are below its threshold. CV steps down every time interval. New DF parameters have been added to use the following features: TempThreshold, Voltage Threshold, TimeInterval, DeltaVoltage, and MinCV.
Changing DSG_0_SMOOTH_OK to be disabled by default	This is to prevent early zero-remaining capacity (RM) occurrence by using correct settings	Default changed	Disable DSG_0_SMOOTH_OK by default

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