

bq27520-G3 to bq27520-G4 Change List

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ABSTRACT

This document describes the changes made from bq27520-G3 to bq27520-G4. The latest ordering information and data sheet is available on the Texas Instruments (TI) Web site.

NOTE: bq27520-G3 uses FW version 3.24 and the bq27520-G4 uses FW version 3.29
 bq27520-G3 ICs ship with silicon version A3. bq27520-G4 ships on silicon version A7.
 bq27520-G3 ICs can be upgraded with bq27520-G4 firmware to achieve identical functionality.

1 Introduction

bq27520-G4 firmware version 3.29 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:

- bq27520YZFR-G4
- bq27520YZFT-G4

The latest version of the evaluation software is required to be able to read and write all the data flash configuration locations. The necessary evaluation software and the corresponding v3.29 SENC file can be downloaded from the [bq27520-G4](#) product folder on ti.com. Existing bq27520 (including EVMs) can be upgraded to the latest firmware version by following the instructions in application note [SLUA453A](#).

NOTE: If a golden image created for another version of bq27520 is loaded into an IC running firmware version 3.29, the IC becomes non-functional and must be replaced. Please ensure all instructions in SLUA453A are followed if upgrading ICs or converting your production line to bq27520-G4.
 The best practice is to generate a new golden image (DFI file) for bq27520-G4.

2 Change Details

Table 1. Change Details

| Change | bq27520-G3 | bq27520-G4 | Comments |
|---------------------------------------|--|--|--|
| Silicon version update | ICs ship with silicon version A3. | ICs ship with silicon version A7 to improve TI production testability and design robustness. | Both IC versions can run either version of FW. |
| Support for larger capacity batteries | Support battery capacity up to 8 Ah. | Support battery capacities up to 32 Ah using Design Energy Scale feature. Design Energy and Avg Power Last Run register units are mWh or cWh depending on the setting of Design Energy Scale (1 or 10). T Rise is also multiplied by Design Energy Scale . | New feature |
| Reserve capacity register change | Reserve Capacity-mW label used. | Reserve Cap-m/cW label used since units depend on setting of Design Energy Scale . | New feature |

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Table 1. Change Details (continued)

| Change | bq27520-G3 | bq27520-G4 | Comments |
|--|--|--|---------------------|
| User Rate register change | <i>User rate-mW</i> label used. | <i>User Rate-m/cW</i> label used since units depend on setting of <i>Design Energy Scale</i> . | New feature |
| SOC smoothing | SOC Smoothing feature not present. | SOC Smoothing added to facilitate smooth transition of reported SOC during charge and discharge. Added register bits to new <i>Operation Configuration D</i> register: <ul style="list-style-type: none"> • [SMTHEN] • [RCJUMPOK] | New feature |
| Fast Qmax Update | Feature did not exist. | Fast Qmax Update added to facilitate Qmax updates. Feature allows computation of Qmax based on full charge and end of discharge conditions without battery relaxation. Added dataflash register <i>Operation Configuration E</i> with configuration options. | New feature |
| Improved Overcharge Handling | Possibility to get into overcharge condition due to change in temperature after charge termination or more accumulated charge-after-charge termination. | DODatEOC is updated after charge termination and not updated if a significant temperature change occurs after charge termination. Charge accumulation after charge termination is tracked for a more accurate calculation of DOD0. Added dataflash register bit: <ul style="list-style-type: none"> • [CHGDODEOC] in <i>Operation Configuration D</i> | New feature |
| Additional SOC_INT configuration flexibility | Some SOC_INT trigger events could not be individually enabled or disabled. <i>Operation Configuration D</i> register did not exist. | New DataFlash register <i>Operation Configuration D</i> contains configuration bits to enable/disable individual SOC_INT trigger events with more flexibility. This includes separate enable/disable bits for over-temp interrupts, algorithm state change interrupts, and dataflash update interrupts. | New feature |
| Disable charger after full charge is reached | Feature not available. | Added new Pin Function Code (PFC) option 3 which allows the BAT_GD pin to follow the [FC] "full charge" bit of the Flags() register. | New feature |
| Final Voltage feature modification | If <i>Voltage()</i> is below dataflash setting of <i>Final Voltage</i> for one second, <i>RemainingCapacity()</i> and <i>SOC()</i> are forced to 0. | If <i>Voltage()</i> is below <i>Final Voltage</i> for a time of <i>Final Volt Time</i> (both in dataflash), <i>RemainingCapacity()</i> and <i>SOC()</i> are forced to 0. Default setting of <i>Final Volt Time</i> is two seconds and is user configurable. | New feature |
| New configuration registers | <i>Operation Configuration D</i> and <i>Operation Configuration E</i> dataflash registers did not exist. | <i>Operation Configuration D</i> and <i>Operation Configuration E</i> dataflash registers added for additional options. | New feature |
| Larger thresholds for low battery warning | <i>SOC1 Set Threshold</i> and <i>SOC1 Clear Threshold</i> are each 1 byte in size. | <i>SOC1 Set Threshold</i> and <i>SOC1 Clear Threshold</i> are each 2 bytes in size to support needs of larger capacity battery packs. | Feature improvement |
| Standard Command addresses | <i>StateOfHealth()</i> , <i>CycleCount()</i> , and <i>StateOfCharge()</i> command addresses are 0x28...0x2d. | <i>StateOfHealth()</i> , <i>CycleCount()</i> , and <i>StateOfCharge()</i> command addresses are 0x1C...0x21. | Feature change |
| State Of Health feature update | Periodic <i>StateOfHealth()</i> simulations could use the current temperature instead of 25°C. | Periodic <i>StateOfHealth()</i> simulations are always forced to use 25°C. | Bug fix |
| Wake from HIBERNATE | Can possibly wake from HIBERNATE upon rising edge of I ² C™ bus. | Device only wakes from HIBERNATE if I ² C traffic is addressed to the fuel gauge. | Bug fix |
| Standard Command Updates | <i>TimeToFull()</i> , <i>AveragePower()</i> , <i>MaxLoadCurrent()</i> , <i>TTEatConstantPower()</i> , <i>MaxLoadTimeToEmpty()</i> , <i>NormalizedImpedanceCal()</i> , <i>DataLogIndex()</i> , and <i>DataLogBuffer()</i> commands present. | <i>TimeToFull()</i> , <i>AveragePower()</i> , <i>TTEatConstantPower()</i> , <i>MaxLoadCurrent()</i> , <i>MaxLoadTimeToEmpty()</i> , <i>NormalizedImpedanceCal()</i> , <i>DataLogIndex()</i> , and <i>DataLogBuffer()</i> commands removed to recover code space for new features. | Feature removal |
| Subcommand Update | IT_DISABLE, FACTORY_RESTORE, ENABLE_DLOG, and DISABLE_DLOG <i>Control()</i> subcommands present. | IT_DISABLE, FACTORY_RESTORE, ENABLE_DLOG and DISABLE_DLOG <i>Control()</i> subcommands removed to recover code space for new features. | Feature removal |

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