

## ***bq20z80-V101 to bq20z80-V102 CHANGE LIST***

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### **ABSTRACT**

This document describes the design considerations required to change a bq20z80-V101 design to a bq20z80-V102 solution. Find the latest ordering information and data sheet on the TI Web site at <http://www.power.ti.com>.

## **1 INTRODUCTION**

The bq20z80-V102 firmware upgrade has been released to enable several feature additions and corrections.

The following new orderable part numbers have been released to support this firmware-upgraded device.

- bq20z80DBT-V102
- bq20z80DBTR-V102

The latest version of the evaluation software is required to be able to read and write all the data flash configuration locations.

To upgrade a previous version of the bq20z80, use the evaluation software available on [power.ti.com](http://power.ti.com) and find the latest encrypted program in the Web folders. For details on how to update the firmware, see the TI application report [SLUA336](#).

**Table 1. CHANGE DETAILS**

<b>CHANGE</b>	<b>bq0z80-V102</b>	<b>bq20z80-V101</b>	<b>COMMENTS</b>
Corrected to allow display to turn off when charging and button pushed.	LED display operates correctly during charging.	LED display would stay on until charging terminated after the button was pushed. Only occurs when LED display not configured to be always on during charging.	Correct operation of the LED display under all conditions
Allow negative LED thresholds to permit LED alarms to be disabled	Configuring negative LED alarm threshold disables LED alarm functionality.	Feature not available	Allow better customization
Allow zero values for ALARM and CHARGING LED blink rates to disable them	Configuring zero value for the LED blink rates disables them.	Feature not available	Allow better customization
Restore initialization of dodcharge in relaxed state so that the correct dodcharge value is used in capacity estimation	dodcharge initialized to the correct value	dodcharge value set to zero	Improved gauging accuracy with correct initialization of dodcharge value.
Only clear offset calibration flag when SMBus lines go high.	Prevents offset calibration occurring just because a safety condition occurs and then clears when the SMBus lines are low.	Offset calibration occurs multiple times if safety condition occurs when SMBus lines are low.	More appropriate period between offset calibrations when SMBus lines are low.
Change so that setting AFE Fail Limit to zero disables PF_AFE_C	Configurable option to allow disabling PF_AFE_C trigger	Feature not available.	Allow better customization

**Table 1. CHANGE DETAILS (continued)**

<b>CHANGE</b>	<b>bq0z80-V102</b>	<b>bq20z80-V101</b>	<b>COMMENTS</b>
Enable LED display to turn off after charge termination and if SMBus lines are detected low and LEDs enabled during charging.	LED display turns off after charge termination.	LED display stays on when charging terminates after SMBus lines are detected low.	Correct operation of the LED display under all conditions
Set charge FET state immediately when entering sleep	Charge FET state set correctly, immediately after entering sleep	The CHG FET would not get set to the correct state for sleep until the first voltage measurement.	Quicker transition of FET to the correct state in sleep
Change <i>DF:Operation Cfg B [CCT = 0]</i> , so that <i>SBS.CycleCount()</i> threshold is in mAh, not in % of FCC	Data flash default bases <i>SBS.CycleCount()</i> calculation on mAh and not % of FCC	<i>DF:Operation Cfg B [CCT = 1]</i> , making the default <i>SBS.CycleCount()</i> calculation to be based on % of FCC	Data flash default changed to reflect common customer usage
When <i>DF:Operation Cfg B [CCT = 1]</i> , so that <i>SBS.CycleCount()</i> threshold is % of FCC, then <i>DF:CC Threshold</i> is used as a minimum for the <i>SBS.CycleCount()</i> threshold	Use <i>DF:CC Threshold</i> as the minimum to prevent rapid incrementing of the <i>SBS.Cyclecount()</i> , damaging the data flash	Small or negative <i>SBS.Full Charge Capacity()</i> values (should not occur under normal operation) from causing the <i>SBS.CycleCount()</i> incrementing rapidly, potentially damaging the data flash	Improved system reliability
When exiting the relaxed state to sleep, the initial charge capacity is correctly calculated	Corrected initial charge capacity calculation to be accurate when exiting relaxed state to sleep	If the relaxed state was exited to sleep after a valid DOD measurement (30-minute default value), then the initial charge capacity would not be recalculated and would result in an incorrect FCC value if the sleep state was exited before another valid DOD measurement (30-minute default value)	More reliable <i>SBS:FullChargeCapacity()</i> calculation under all system conditions
Correct update of Remcap in relaxed state to use passed charge	Charge or discharge current accumulated in a relaxed state used to update Remcap	If the relaxed state was exited after the accumulation of significant charge or discharge current (over at most 100 seconds with default values), the RemCap and FCC would be in error by this charge. This is only significant if the relaxed state can exist with significant current as determined by application settings.	More reliable <i>SBS:FullChargeCapacity()</i> <i>SBS:RemainingCapacity()</i> calculation under all system conditions
Implement disable of resistance update based on accumulative scale. If the product of 15 consecutive (default value) resistance scale factors is less than 0.5 or more than 1.5, then resistance update is disabled until the next valid soc measurement. Sets bit 2 of Operation Status to indicate resistance update disabled.	Prevent invalid soc values from causing incorrect resistance updates	Incorrect resistance updates that could result from invalid soc values	More reliable resistance updates under all system conditions
Implement disable of resistance update based on estimated capacity error. Sets bit 2 of Operation Status to indicate resistance update disabled.	Prevent invalid soc values from causing incorrect resistance updates	Incorrect resistance updates that could result from invalid soc values	More reliable resistance updates under all system conditions
Disable Qmax increment if due to Grid 14 and exit of discharge	Prevent unnecessary Qmax increments	Qmax increments can occur due to Grid 14 and exit of discharge	Improved Qmax data reliability under all system conditions.

**Table 1. CHANGE DETAILS (continued)**

<b>CHANGE</b>	<b>bq0z80-V102</b>	<b>bq20z80-V101</b>	<b>COMMENTS</b>
Drive all unused pins low	Provides better ESD immunity	Not all unused pins driven low	Improved ESD immunity
Initial charge capacity calculation when dod0 is measured in the overdischarged state is corrected	Overdischarged state does not affect the accuracy of FCC calculations	An incorrect initial charge capacity affects FCC that is calculated during discharge or a Qmax update. If FCC is not changed by a Qmax update, then reported RemainingCapacity could be negative after 5 hours of relaxation	More reliable <i>SBS:FullChargeCapacity( )</i> <i>SBS:RemainingCapacity( )</i> calculation under all system conditions
Correct calculation of FCC and RemCap when dod0 is taken when the battery is overdischarged or overcharged. This allows RemCap to go negative, or greater than FCC (though is only reported from 0 - FCC).	Overcharged/Overdischarged does not affect the accuracy of FCC and RemCap calculations	The RemainingCapacity will increment (or decrement) during charging (discharging) even when the battery is in an overdischarged (overcharged) state.	More reliable <i>SBS:FullChargeCapacity( )</i> <i>SBS:RemainingCapacity( )</i> calculation under all system conditions
Change cell imbalance <i>DF:Battery Rest Time</i> from 1 byte to 2 bytes and set the default value to 1800 seconds	New feature providing improved customization	Feature not available	Improved customization for Cell Imbalance detection
Use upper and lower limit for resistance accumulative scale. Set default values to 300% and 30%.			More reliable resistance updates under all system conditions
Add <i>DF:CF MaxError limit</i> for setting <i>SBS.BatteryMode( ) [CONDITION FLAG]</i> . Set default value to 100%.	New feature providing improved customization	Feature not available	Improved customization
Use <i>SBS.AtRate( )</i> , <i>UserRate</i> and <i>C/5</i> rate for relaxed capacity calculation, respectively, if set by Load Select; otherwise, use previous rate.			More reliable <i>SBS:FullChargeCapacity( )</i> <i>SBS:RemainingCapacity( )</i> calculation under all system conditions
Correct Host Watchdog from being reset by broadcasts	Host Watchdog functionality not affected by alarm or charger broadcasts	Host Watchdog reset by alarm or charger broadcasts	Reliable Host Watchdog functionality under all system conditions
The voltage table chemistry ID can be read by writing 0x0008 to <i>ManufacturerAccess</i> and then reading from <i>ManufacturerAccess</i> . The default chemistry ID is 0x0100	New feature providing more information	Feature not available	Improved information access
<i>SBS.BatteryMode( )</i> is initialized on high transition of the SMBus lines to <i>DF:Init BatteryMode</i> , instead of always clearing <i>SBS.BatteryMode( )</i> defined bits on high transition of the SMBus lines.	Customization allows for preserving <i>SBS.BatteryMode( )</i> settings through SMBus line transitions	Feature not available	Improved customization

SUMMARY

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**Table 1. CHANGE DETAILS (continued)**

<b>CHANGE</b>	<b>bq0z80-V102</b>	<b>bq20z80-V101</b>	<b>COMMENTS</b>
Broadcast timers are set correctly on high transition of SMBus lines. The timers are set to 10 seconds on high transition of SMBus lines.	Broadcast timer accurate regardless of CC offset calibration or entry to sleep	Broadcast timer accuracy required a CC offset calibration and entry to sleep.	Improved broadcast timing accuracy to meet Smart Battery Data spec

**2 SUMMARY**

These significant changes improve system interaction stability and reliability under all system conditions.

- Recommended configuration file changes for existing applications include:
  - Configuring the new *DF:Battery Rest Time* feature
  - Configuring the new *DF:Init Battery Mode* feature
  - Configuring the new *DF:CF MaxError Limit*
  - Configuring the new *DF:AFE Fail Limit* feature
  - Configuring the new *DF:LED Flash Rate* and *DF: LED Blink Rate* feature
  - Configuring the new *DF:Chg Flash Alarm* and *DF:Dsg Flash Alarm* feature

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