Application Report
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Updating Firmware With the bq2750x and EVM

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ABSTRACT

This application report provides the procedure to update bq2750x firmware and the learned golden image (*.DFI file) in bq27500 data flash from the previous firmware version.

Save Data Flash Content Before and After Firmware Update

Note: If the data flash has no learned value that needs to be saved, proceed to the section entitled *Update Firmware in the EVM*.

Before the firmware can be updated, the original data flash content must be saved as an old Data Flash Image (DFI) file to prevent loss of the learned data flash value. Once the firmware is updated, the original data flash content is lost. Instead, a default DFI is copied to the device during the firmware update. Assume that the original data flash content is generated from the learning cycle. It is critical that the data flash content is set back to the previous contents. The two methods to update the data flash after a firmware update follow.

1. Begin by proceeding through bqEASY to generate new data flash contents.
   This method is time consuming but it is less likely to generate a compatibility issue when running the new firmware.
2. Update the data flash using the old DFI file.

The DFI file saved from the previous firmware version has a different checksum than that of the current firmware version. Hence, the old version DFI cannot be directly used in new firmware. If bqEASY is used to configure the same battery pack, the only differences are the resistance Ra value and the Qmax value.

To update the old DFI file, perform the following steps.

1. Create DFI file (see Figure 1).
   Figure 1 is the user interface in bqEASY step 3F to save the DFI file to the default directory: C:\Program Files\Texas Instruments\bq Evaluation Software\Plugins\Projects with file name:*_0500_01xx_CONFIGURED.dfi* . This file can be renamed and used to update the same batch of devices which had a firmware update that also requires data flash update.

Figure 1. Create New DFI File

2. Load the old DFI file into the device with the old firmware version that matches the old DFI version using step 1B of bqEASY (see Figure 2).

Figure 2. Load the DFI File

3. Go to the Data Flash screen and read all the data flash contents, and export the data flash into the old.gg file (see Figure 4) . Modify the old.gg file to the new.gg file by opening the old.gg file and changing the firmware version in the file header.

4. Set the device into ROM mode, and program the new firmware as described in the section entitled *Update Firmware in the EVM* of this document.
5. Because the chemistry is already identified from the previous learning cycle, the chemistry can be programmed into the device directly from the chemistry table. In order to do this, go to step 4B of bqEASY to select the chemistry manually (see Figure 3).

Figure 3. Load Chemistry

6. Go to Data Flash screen and Import the new.gg file into the device (see Figure 4). After loading the new.gg file, click the ***Write All*** button to write these data flash values into the device. Because the data flash configuration may not be the same between old firmware version and new firmware version, an error message may occur.

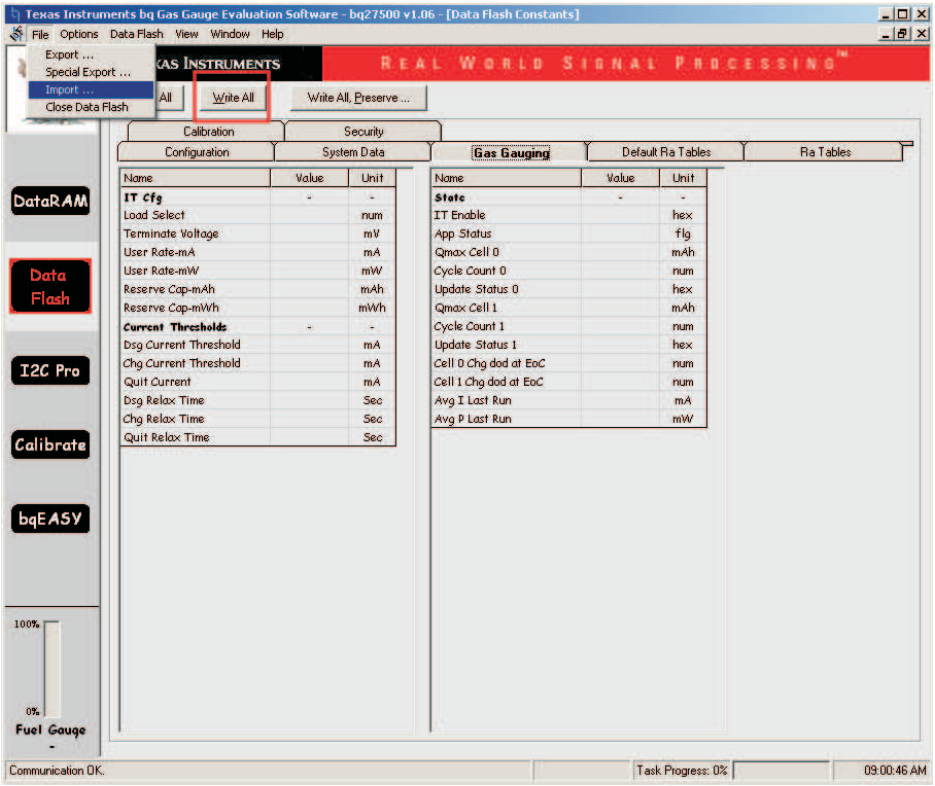

Figure 4. Export and Load *.gg File

7. Go to bqEASY step 3F (see Figure 1), and read the DFI under the updated firmware version. (**Caution**: Skipping this step will cause corrupted DFI)
8. Generate Golden Image file (see Figure 5).

   In order to generate the Golden Image file, the *Update Status* has to be set to **02** from the learning cycle.Figure 5 is the user interface in bqEASY step 5B to generate the Golden Image DFI file to the default directory: C:\Program Files\Texas Instruments\bq Evaluation Software\Plugins\Projects with file name: *_0500_01xx_GOLDEN.dfi* . bqEASY also updates the necessary data flash contents when generating the golden image before saving the DFI file. This file can be renamed and used in mass production.

Figure 5. Create New Golden Image File

Update Firmware in the EVM

1. Disable the scanning in DataRAM before updating the firmware.
2. Power up the evaluation module (EVM) by applying 4 Vdc between Pack+ and Pack–. This step is unnecessary if the cell is already attached.
3. Start the EV Software.
4. Navigate to the *I2C Pro* screen.
5. Put the device into ROM mode by setting the ***Write I2C Data Block*** section as: *I2C Command: 00 Data Block (hex): 000f*, and click the ***Write Data*** button (see Figure 6).

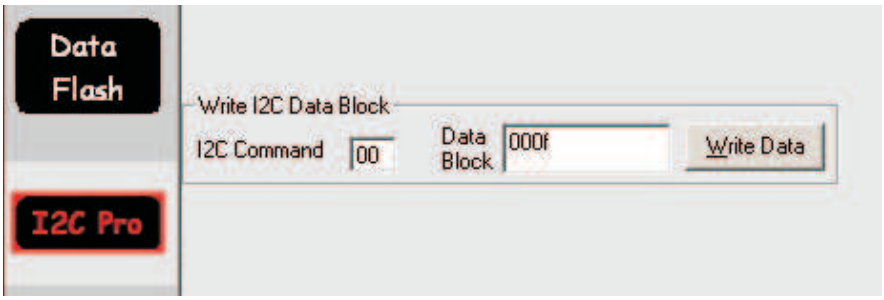

Figure 6. Command to Set the Device in ROM Mode for Firmware Programming

6. In the *bq275xx Programming* section, enter the path and file name for the new firmware file (*.senc). If needed, click the (…) button to browse for the file location (see Figure 7).

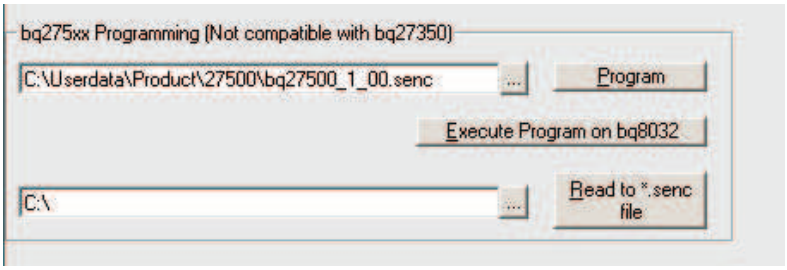

Figure 7. Programming the Firmware (Encrypted SREC)

7. Click the ***Program*** button to program the firmware (see Figure 7). All flash-constants information including calibration will be lost; so, export it beforehand into a (*.gg) file or *.DFI file
8. Once programming is finished, execute the program by clicking ***Execute Program on bq8032*** button (see Figure 7).
9. Close and restart the EV Software so that the new version of firmware is recognized.

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