User's Guide
SLUUBU3–June 2018

TI Fuel Gauge Authentication Key Packager and Programmer Tools

Several TI Fuel Gauge products support authentication for anti-counterfeit protection of battery packs. The selection of the battery authentication scheme between SHA and ECC is left to the user to decide. This user guide describes the function and use of the tools provided by Texas Instruments to package the key (bqKeyPackager), and program the key onto the selected gauge (bqKeyProgrammer).

The purpose of these two standalone tools is to allow an OEM to encrypt authentication keys in a file and send to a packmaker. The packmaker can then use this file as the data source for bqKeyProgrammer. bqKeyProgrammer will program the key(s) within the file into a gauge. The key will not be visible to the packmaker.

The tools are available on the Battery Fuel Gauge Tools and Software page.

Contents

List of Figures

List of Tables

Trademarks

1 bqKeyPackager

bqKeyPackager is intended only for an OEM to allow packaging of the authentication key. The authentication key is entered along with a password that is used in an algorithm to encrypt the file. After testing using bqKeyProgrammer or other tools, OEM will send the created file and password to the packmaker. The packmaker will use this bqkey file and password in bqKeyProgrammer to program the information into a gauge.

The type of Authentication supported depends on the device selected. Version 1.0.9 supports SHA1, SHA256, and ECC. The information needed from the battery pack designer is different depending on the authentication chosen, and is shown in Figures 1, 2, and 3.

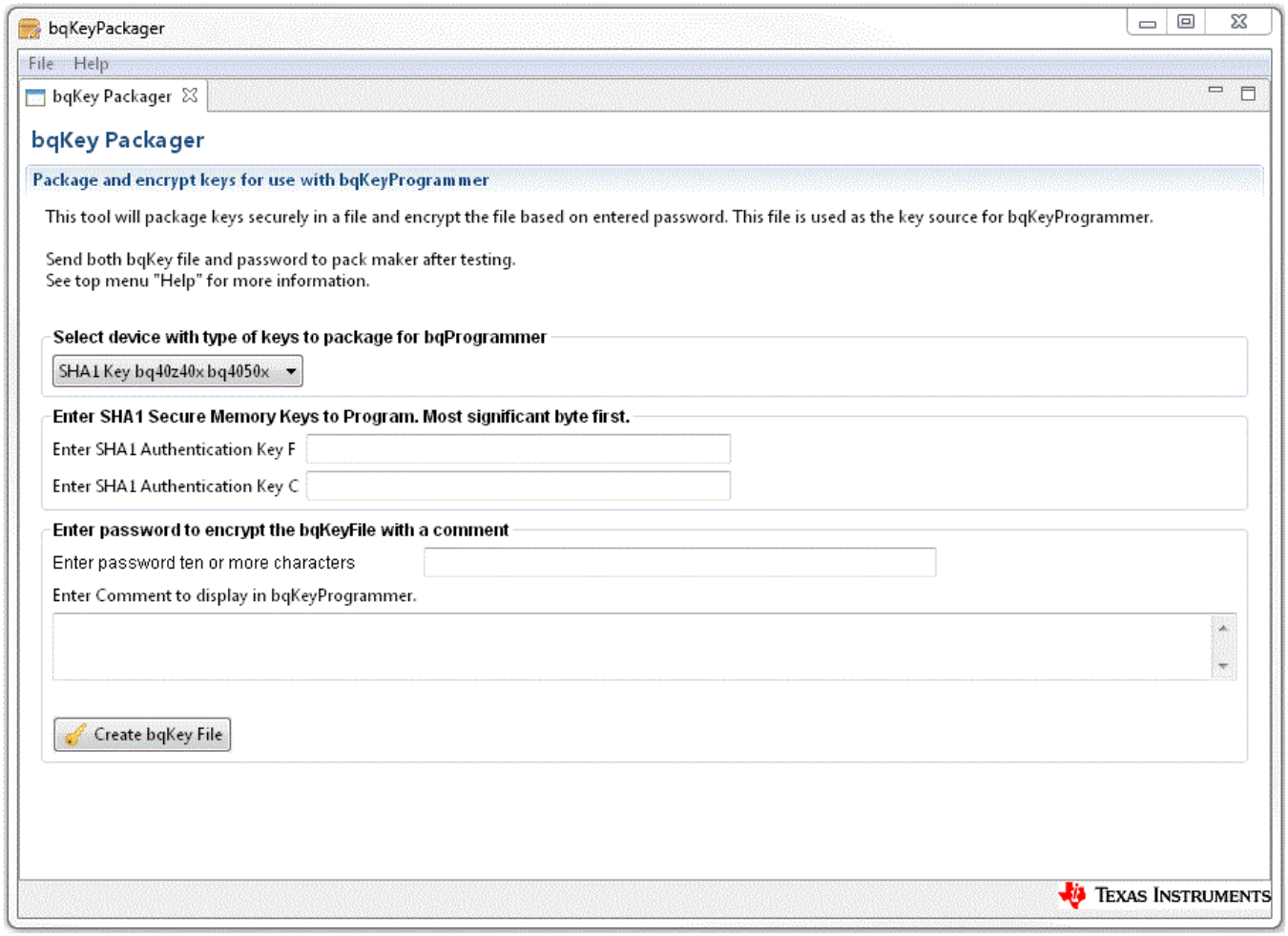

Figure 1. bqKeyPackager for SHA1 Device

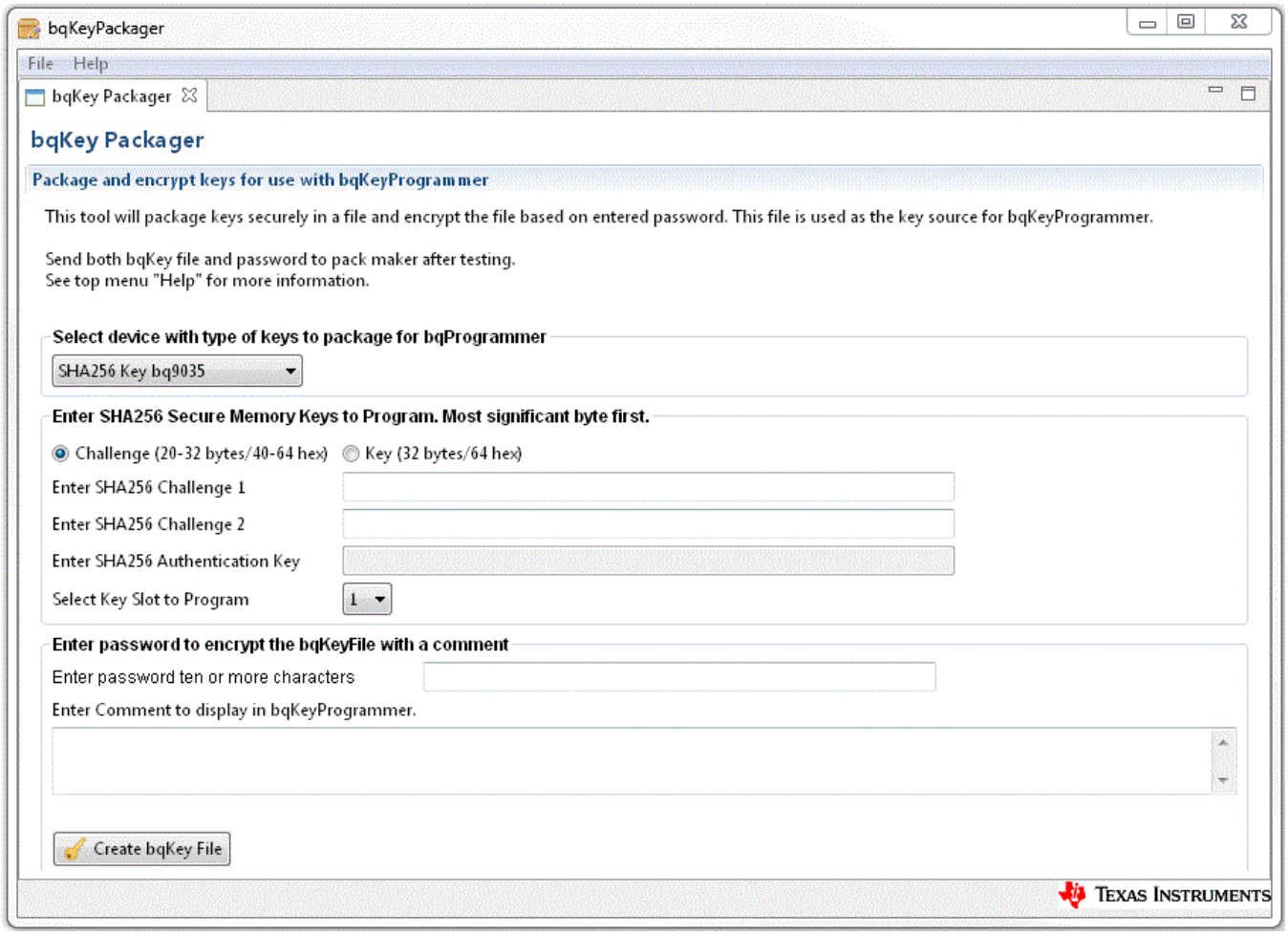

Figure 2. bqKeyPackager Screen for SHA256 Device

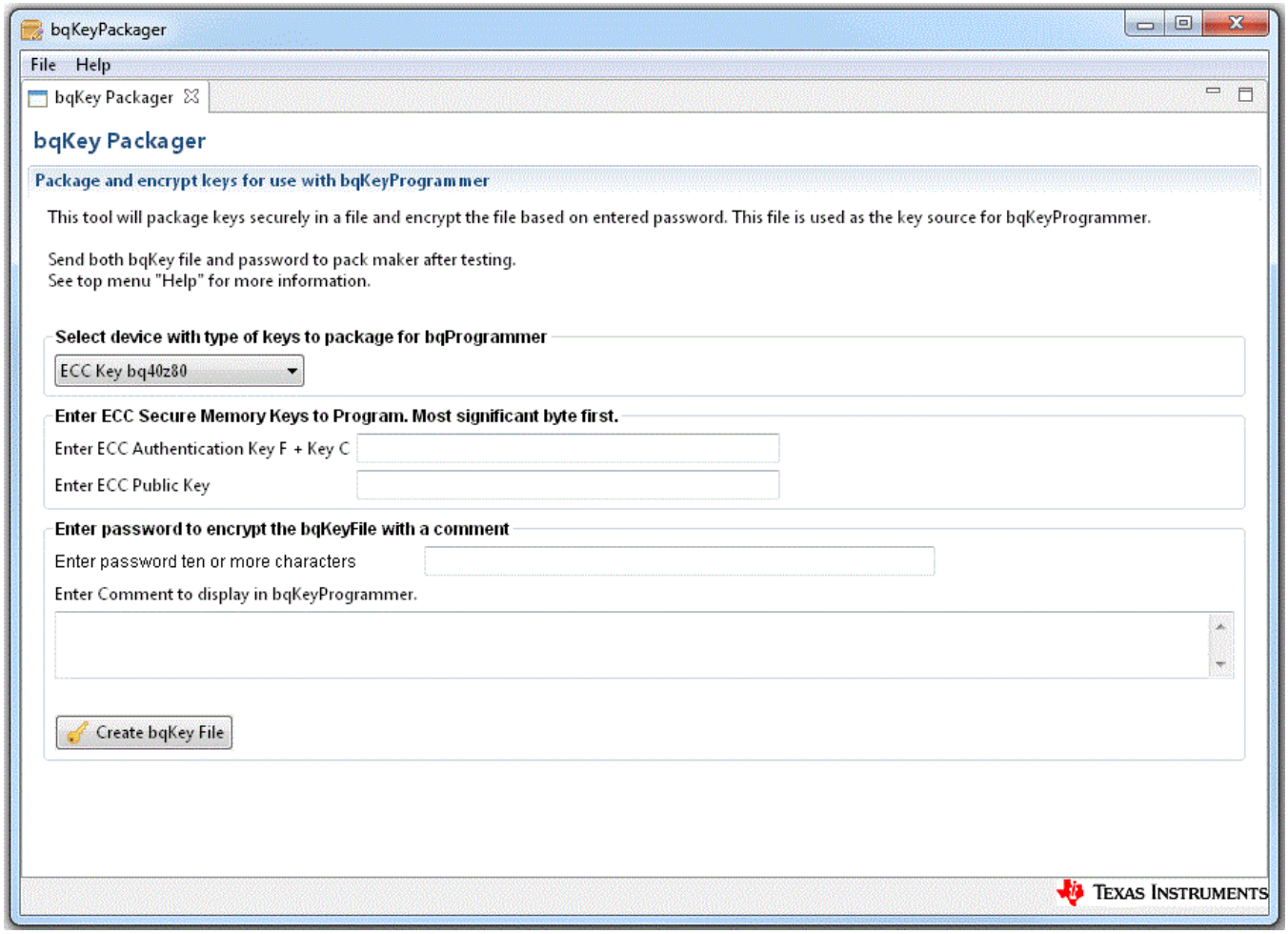

Figure 3. bqKeyPackager Screen for ECC Device

2 bqKeyProgrammer

bqKeyProgrammer programs the packaged information in the bqkey file supplied by an OEM into the secure one time programmable memory in the supported gauge. The bqKey file and password are supplied as inputs. The bqKey file is the source data of the key(s) to program. This tool requires a working EV2300/EV2400 communications adapter with drivers and compatible gauge connected to SMB port of adapter. This tool will “Program Key” and verify the key was programmed correctly using the content of the key file as the reference. The “Verify Key” will verify gauge key match the key contained in the bqKey file. The following steps are used to program the key on the device:

- Connect the computer running bqKeyProgrammer to the EV2300/2400 using the USB Cable.
- Connect the EV2300/2400 to the target gauge using the appropriate communication port for the device (SMBus, I2C, and so forth), making sure the target gauge is powered.
- Open bqKeyProgrammer.
- Select the bqKey file to use and enter the password for the file.
- Select "Load File" to load the bqKey file. Any comments in the bqKey file will be visible in the comments text display. It is important to ensure that the bqKey file is correct for the device. **Programming is one time only and can not be reversed.**
- Select "Program Key" to program the key into the device. The hot key is Alt + P. The status is located to the right of the button. Green is passed. Red is failure.
- Select "Verify Key" to verify a challenge sent to the device matches the expected response based on

information in the bqKey file. The hot key is Alt + V.

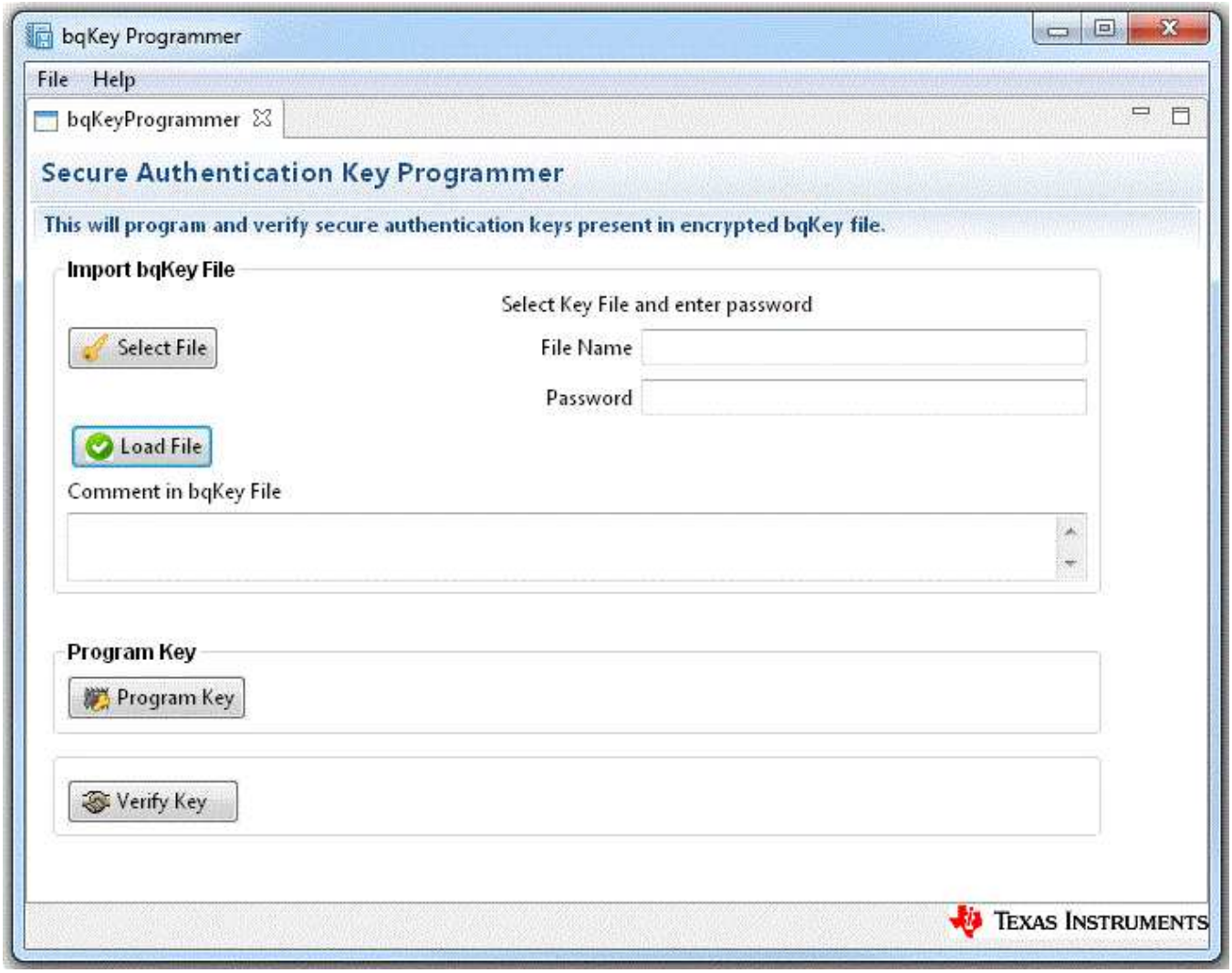

Figure 4. bqKeyProgrammer Screen

NOTE: bqKeyProgrammer programs the one time program memory. If communication is lost or the incorrect bqKey file is used, the device will not be useable for authentication. Check the comments in the bqKey file to ensure the correct file is selected. Ensure the programmer is finished before disconnecting communications and power. A complete power on reset is needed after programming to lock memory.

IMPORTANT NOTICE FOR TI DESIGN INFORMATION AND RESOURCES

Texas Instruments Incorporated ('TI") technical, application or other design advice, services or information, including, but not limited to, reference designs and materials relating to evaluation modules, (collectively, "TI Resources") are intended to assist designers who are developing applications that incorporate TI products; by downloading, accessing or using any particular TI Resource in any way, you (individually or, if you are acting on behalf of a company, your company) agree to use it solely for this purpose and subject to the terms of this Notice.

TI's provision of TI Resources does not expand or otherwise alter TI's applicable published warranties or warranty disclaimers for TI products, and no additional obligations or liabilities arise from TI providing such TI Resources. TI reserves the right to make corrections, enhancements, improvements and other changes to its TI Resources.

You understand and agree that you remain responsible for using your independent analysis, evaluation and judgment in designing your applications and that you have full and exclusive responsibility to assure the safety of your applications and compliance of your applications (and of all TI products used in or for your applications) with all applicable regulations, laws and other applicable requirements. You represent that, with respect to your applications, you have all the necessary expertise to create and implement safeguards that (1) anticipate dangerous consequences of failures, (2) monitor failures and their consequences, and (3) lessen the likelihood of failures that might cause harm and take appropriate actions. You agree that prior to using or distributing any applications that include TI products, you will thoroughly test such applications and the functionality of such TI products as used in such applications. TI has not conducted any testing other than that specifically described in the published documentation for a particular TI Resource.

You are authorized to use, copy and modify any individual TI Resource only in connection with the development of applications that include the TI product(s) identified in such TI Resource. NO OTHER LICENSE, EXPRESS OR IMPLIED, BY ESTOPPEL OR OTHERWISE TO ANY OTHER TI INTELLECTUAL PROPERTY RIGHT, AND NO LICENSE TO ANY TECHNOLOGY OR INTELLECTUAL PROPERTY RIGHT OF TI OR ANY THIRD PARTY IS GRANTED HEREIN, including but not limited to any patent right, copyright, mask work right, or other intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information regarding or referencing third-party products or services does not constitute a license to use such products or services, or a warranty or endorsement thereof. Use of TI Resources may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

TI RESOURCES ARE PROVIDED "AS IS" AND WITH ALL FAULTS. TI DISCLAIMS ALL OTHER WARRANTIES OR REPRESENTATIONS, EXPRESS OR IMPLIED, REGARDING TI RESOURCES OR USE THEREOF, INCLUDING BUT NOT LIMITED TO ACCURACY OR COMPLETENESS, TITLE, ANY EPIDEMIC FAILURE WARRANTY AND ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND NON-INFRINGEMENT OF ANY THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

TI SHALL NOT BE LIABLE FOR AND SHALL NOT DEFEND OR INDEMNIFY YOU AGAINST ANY CLAIM, INCLUDING BUT NOT LIMITED TO ANY INFRINGEMENT CLAIM THAT RELATES TO OR IS BASED ON ANY COMBINATION OF PRODUCTS EVEN IF DESCRIBED IN TI RESOURCES OR OTHERWISE. IN NO EVENT SHALL TI BE LIABLE FOR ANY ACTUAL, DIRECT, SPECIAL, COLLATERAL, INDIRECT, PUNITIVE, INCIDENTAL, CONSEQUENTIAL OR EXEMPLARY DAMAGES IN CONNECTION WITH OR ARISING OUT OF TI RESOURCES OR USE THEREOF, AND REGARDLESS OF WHETHER TI HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

You agree to fully indemnify TI and its representatives against any damages, costs, losses, and/or liabilities arising out of your non-compliance with the terms and provisions of this Notice.

This Notice applies to TI Resources. Additional terms apply to the use and purchase of certain types of materials, TI products and services. These include; without limitation, TI's standard terms for semiconductor products http://www.ti.com/sc/docs/stdterms.htm), evaluation modules, and samples (http://www.ti.com/sc/docs/sampterms.htm).

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265