BC5161 Fuse Programming Tool Application Guidelines

D/N: AN0574EN

Introduction

The BC5161, designed and produced by Holtek, is an integrated programmable encoder 2.4GHz wireless transmitting device. The device is suitable for use in various 2.4GHz wireless remote controller applications. The transmitting frequency range lies within the 2402 MHz to 2480MHz unlicensed ISM frequency band.

The BC5161 includes an integrated high power amplifier, a digital GFSK modulation and a packet encoder. The device's RF characteristics comply with the International FCC/ETSI requirements. The BC5161 has up to 8 key functions with its 16-pin QFN package, 4.2 billion (2^{32}) encoder addresses, a maximum of +8dBm transmission power and up to 500Kbps transmission rate. The device provides an auto wake-up function for transmission and auto hopping frequency function. Additionally, the device matching circuit makes it easy to add new devices.

For additional convenience and ease of use, the BC5161 has a unique integrated OTP (One Time Programmable) Fuse Memory. When used together with the Holtek supplied software, users can set the RF transmitting power, frequency band, address and other parameters.

This guide introduces the fuse programming tool and provides some examples to assist users in its usage.

Functional Description

The BC5161 is a high frequency signal transmitter which uses non-integer phase-locked multiplication technology. The device includes an integrated non-integer frequency multiplier, frequency modulator and an output amplifier. The structure is shown in the following figure.

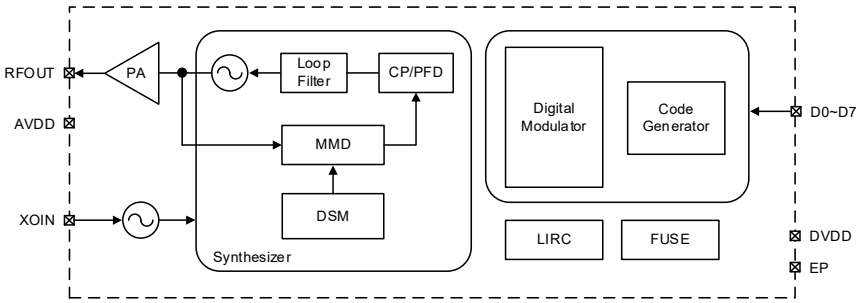

Figure 1. BC5161 Internal Block Diagram

The Fuse Data Memory shown in the block diagram is a special function included within the BC5161, which when used together with the programming software provided by Holtek, allows the easy configuration of the BC5161 parameters. These parameters include RF transmitting power, frequency band, address, keys and so on. Note that the programmed bits are non-recoverable.

Hardware Connection

Programmer: e-Link or e-WriterPro.

http://www.holtek.com/e-link

Figure 2

http://www.holtek.com/e-writerpro

Figure 3

e-Socket programming socket: ESKT8SOP-RF2.4G / ESKT16QFN-RF2.4G.

http://www.holtek.com/e-socket

Figure 4. Connection Method

Figure 5

Software Download

To locate the software search using the keyword “BC5161” on the Home page of the Holtek official website and click on the “Software & Tools” option in the product page.

Users can also refer to the following link directly:

https://www.holtek.com/web/guest/tool-results/-/display/tool/419

Then click on the “RF Chip Parameters Setting Tool” to download the software.

Software Installation

After the download and file decompress process has completed, an installation file will appear, click on this to start the installation.

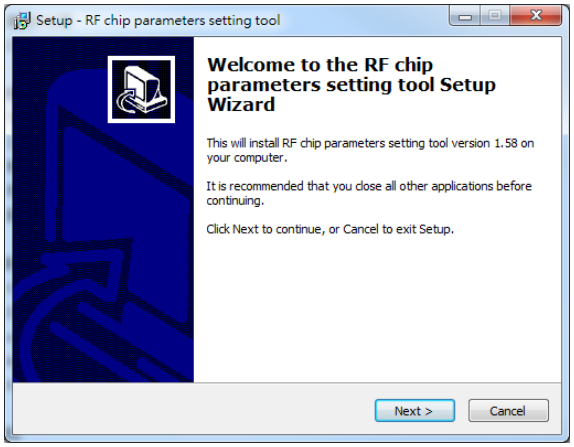

Figure 6

Select the installation path. This can be setup manually or the default path can be used.

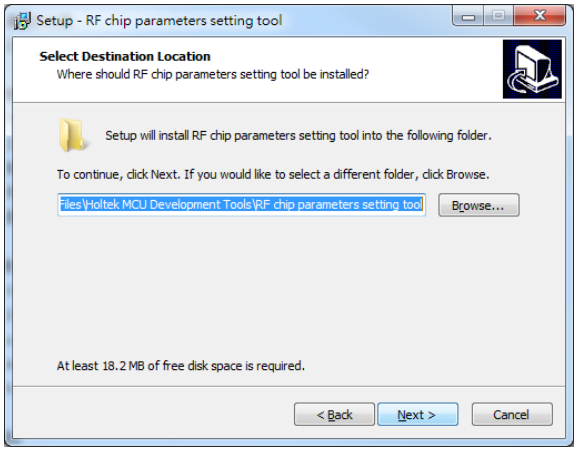

Figure 7

Select the installation directory. This can be setup manually or the default file name can be used.

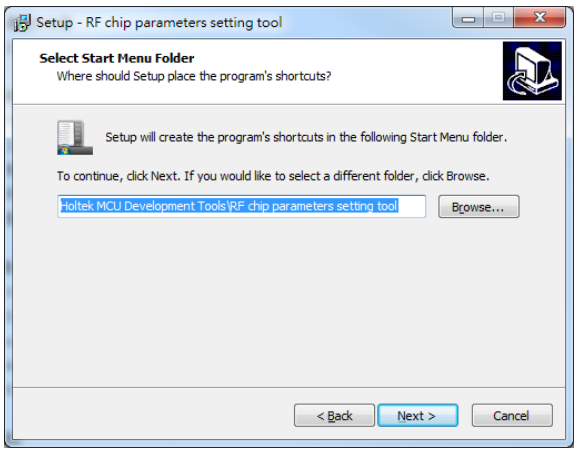

Figure 8

Setup a shortcut on the desktop.

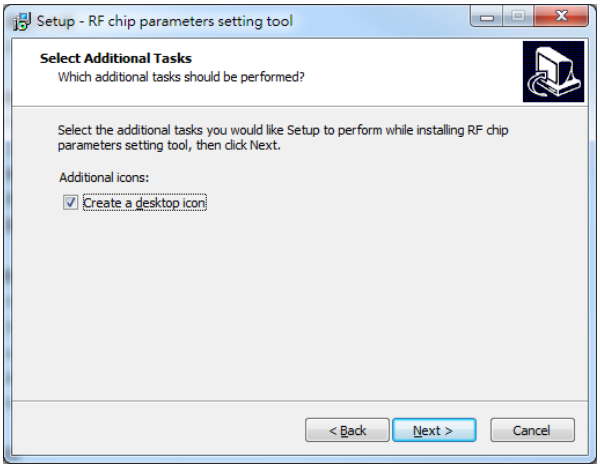

Figure 9

Click the “Install” button to start the installation.

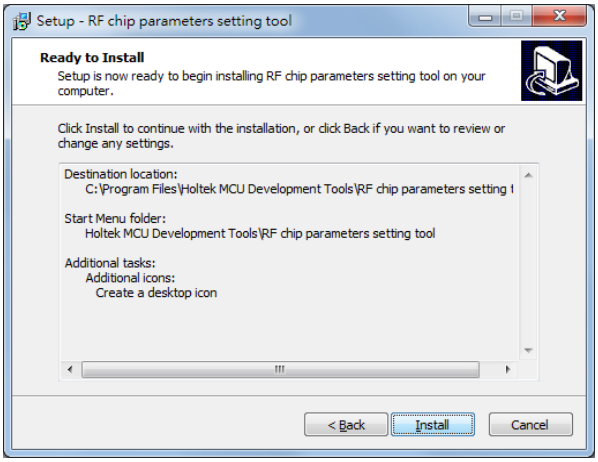

Figure 10

During installation the following screen will appear.

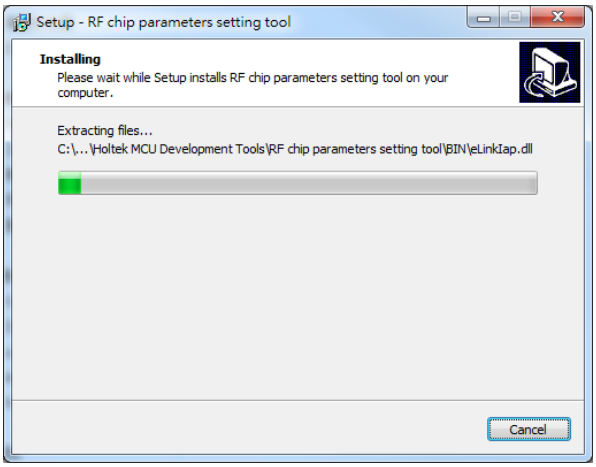

Figure 11

Click “Finish”. Check the option shown in the following picture to execute the software.

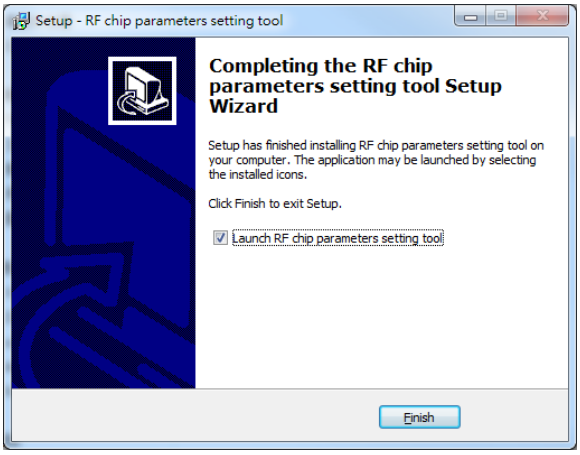

Figure 12

Software Function

After the programming software has been executed, there are four main function options listed at the top of the window:

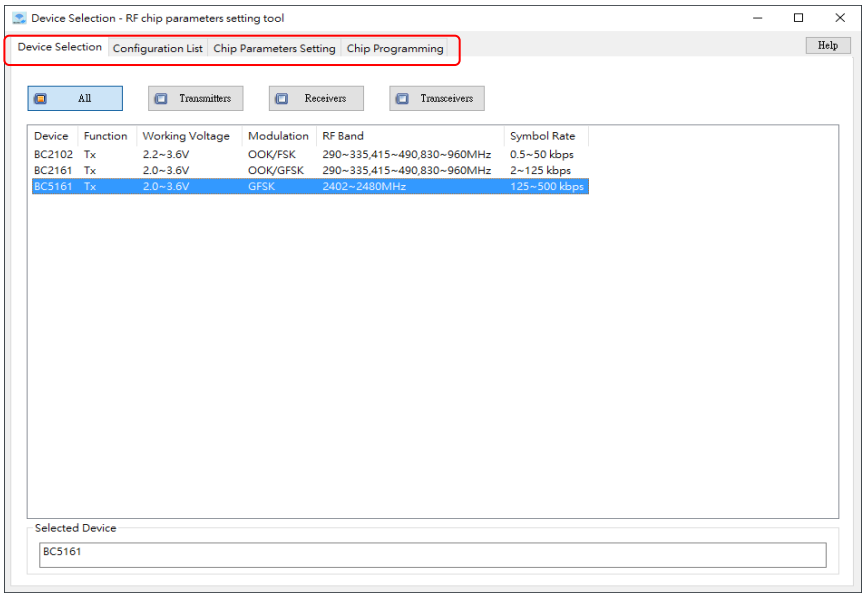

Figure 13

1. Device Selection
2. Configuration List
3. Chip Parameters Setting
4. Chip Programming

The four main function pages are described below.

Device Selection

Select the corresponding IC.

Configuration List

The Chip Parameter Setting files with different RF parameter values and settings are listed here.

Chip Parameters Setting

The BC5161 supports the following RF parameter settings - refer to the corresponding datasheet for more detailed information:

- Crystal C-load
- LED_SWD
- Data Rate
- Package Type
- TX Power
- CRC_EN
- etc.

Chip Programming

In this page the following functions are provided:

- Load File → Loads the parameter files in which the RF parameters have been preset.
- Download → Used in combination with the e-WriterPro.
- Read → Reads out the current Fuse setting values.
- Blank Check → Check if the IC has been programmed or not.
- Program → Click to start programming.
- Verity → Confirms if the programmed values are correct.
- Smart Programming → Used in combination with the e-WriterPro.

Usage Considerations

When connecting to the BC5161, if the following window pops up, this indicates that Holtek now has a new software version available. Users can choose whether to update the software or not.

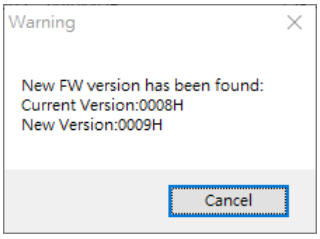

Figure 14

If not required, click on “Cancel”.

If the new version is required, click the “Help” button on the upper right of the screen, then select “Update Firmware” to initiate the update.

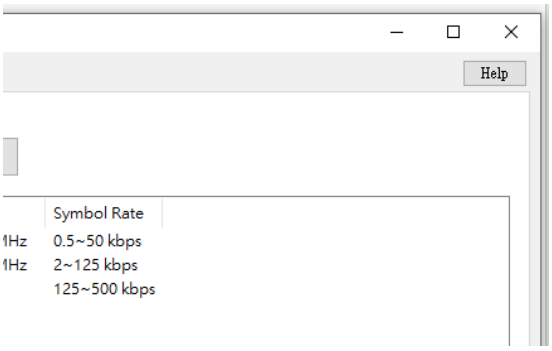

Figure 15

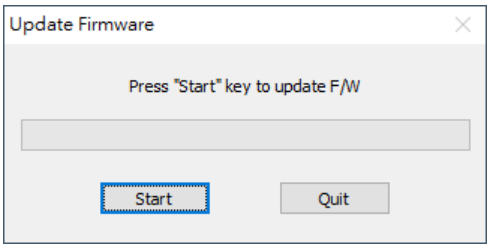

Figure 16

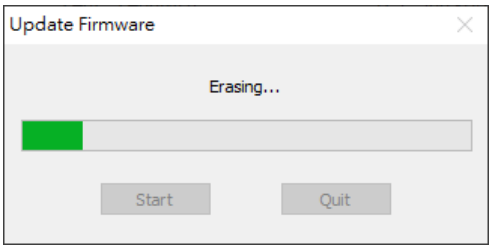

Figure 17

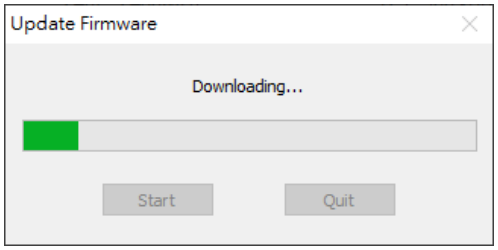

Figure 18

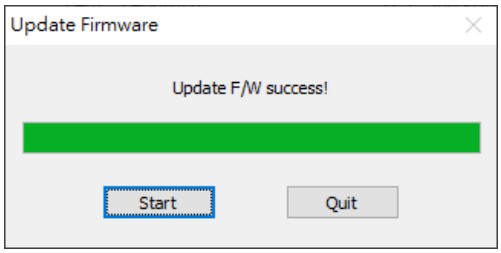

Figure 19

After the update has finished, click “Quick” to exit.

Example 1

Purpose: RF parameter file preparation.

Tool: Software only.

Step1: Click the shortcut on the PC desktop after which the following window will pop up.

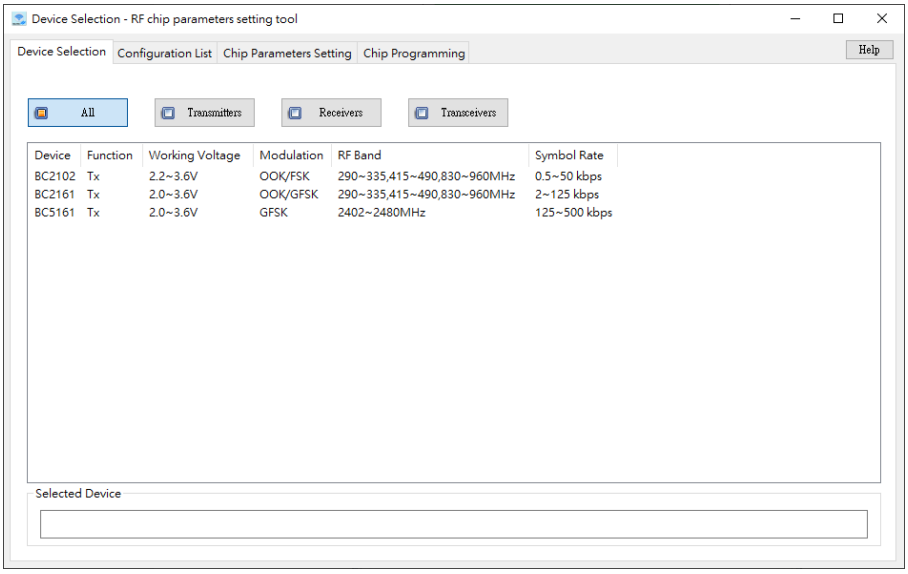

Figure 20

Step2: Double-click on BC5161 after which the UI will switch to the “Configuration List” page.

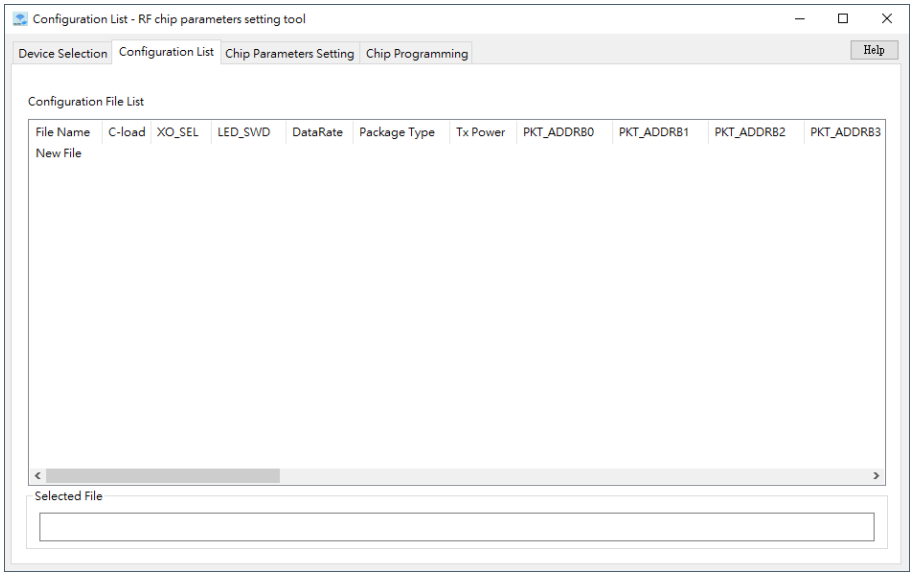

Figure 21

Step3: Double-click the “New File”, the software UI will automatically switch to the “Chip Parameters Setting” page.

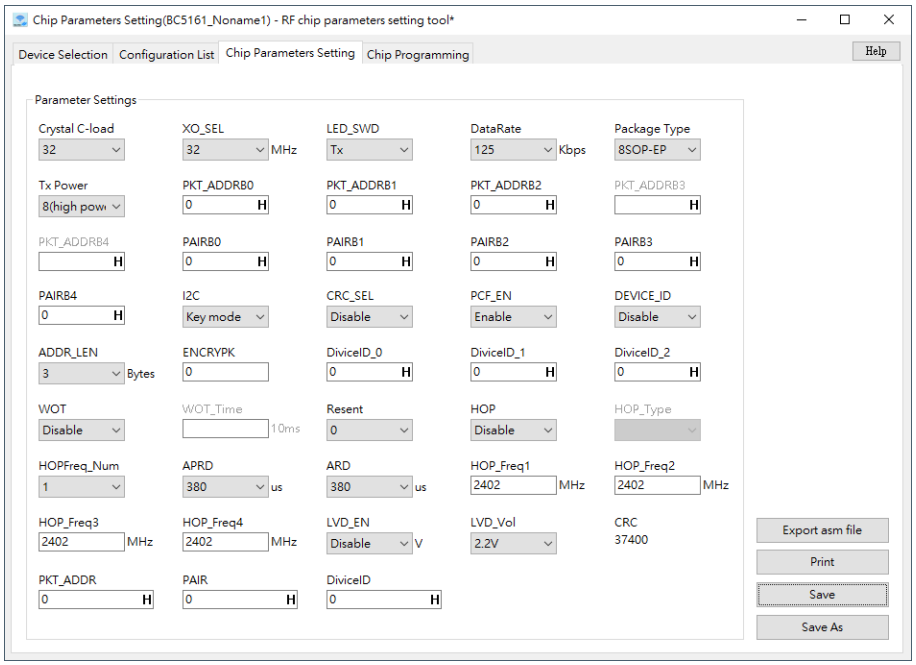

Figure 22

Step4: After completing all the settings, click the “Save As” button in the bottom right of the screen to save the settings as a file with a custom name or click the “Save” button to store the settings as a file with the default name.

Example 2

Purpose: Check if the BC5161 has been programmed which means checking if the IC is empty. After this read the IC programmed data.

Tool: e-Link + e-Socket or e-Link + user's own PCB.

Step1: Click the shortcut on the PC desktop to execute the software.

Step2: Double-click the BC5161, the UI will switch to the "Configuration List" page, and then double-click the "New File".

Step3: The UI will switch to the "Chip Programming" page, the values shown in the window are the BC5161 default settings.

Step4: Users can also click on the "Read" / "Blank Check" to check if the Fuse has been programmed or not. This will be shown in the "Message" window at the bottom right area of the screen.

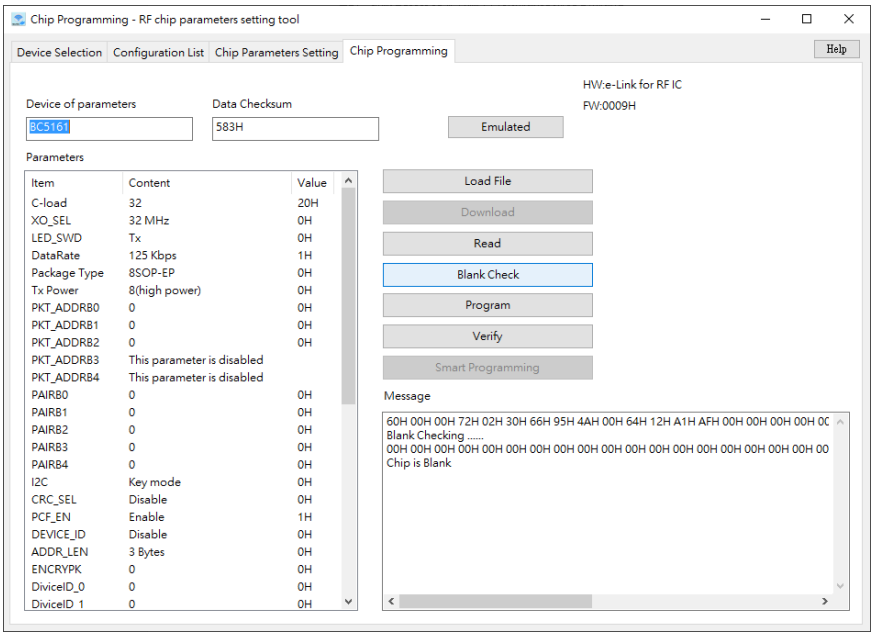

Figure 23

Example 3

Purpose: Programming the IC. Users can create new parameter setting values directly or use the preset parameter files.

Tool: e-Link + e-Socket or e-Link + user's own PCB.

Step1: Click the shortcut on the PC desktop to execute the software.

Step2: After confirming that the hardware has been connected then go to the "Device Selection" page and double-click on BC5161.

Step3: Switch to the "Configuration List" page and double-click the "New File" button. The software window will then automatically switch to the "Chip Parameters Setting" page to allow users to select their required settings.

Step4: After selecting the required settings in the "Chip Parameter Setting" page, users can switch the software window to the "Chip Programming" page. The parameter box on the left lists all the RF parameter values setup during Step3 while the message box in the bottom right shows the Fuse values in hexadecimal format.

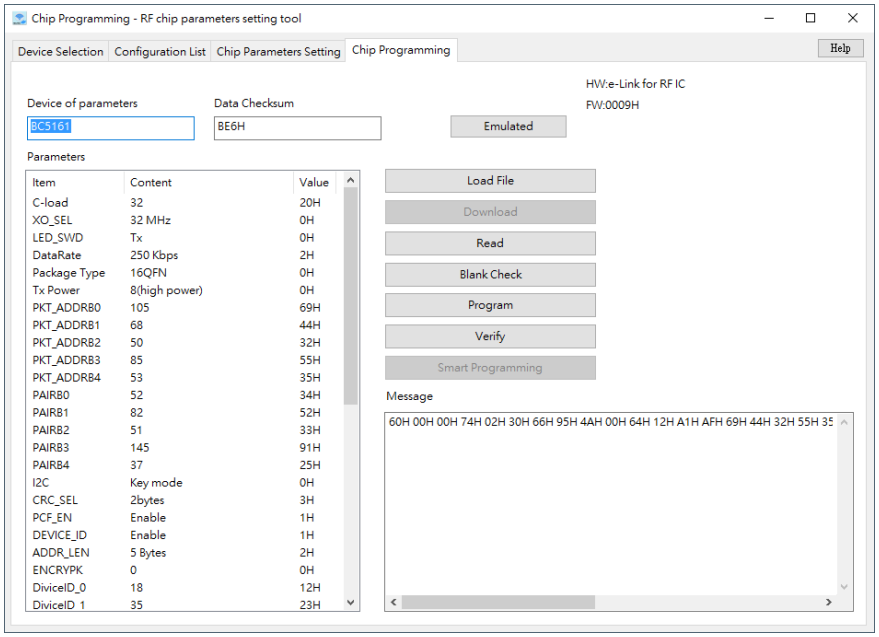

Figure 24

Step5: After the above steps have been executed, click the "Program" button to start programming. Before the actual programming process begins, a "Blank Check" operation will be executed to ensure correct programming. If the Blank Check operation has been successful, meaning that the IC is blank, then programming will be executed automatically. If the Blank Check has not been successful, meaning that the IC is not blank, the programming operation will not be executed and a warning message will pop up. The software will then wait for a user input to determine the next action. The figure below shows the warning message box.

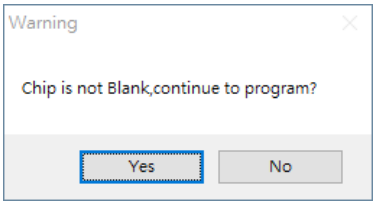

Figure 25

Step6: If using a previously setup RF parameters setting file to program the IC, after the Step 2 operation has been executed, click the "Load" button. Now the software will automatically open the system default folder in which users can select and open their required file.

Step7: Check the information in the “Parameters” and “Message” boxes to determine whether the parameters are correct. If correct, the program operation can be executed.

If there are any errors or setting changes, switch to the “Chip Parameters Setting” page for re-configuration and then switch back to the “Chip Programming” page.

Example 4

Purpose: Use the e-WriterPro tool for programming.

Tool: e-WriterPro + e-Socket - inserted into the e-WriterPro Line Pin.

Step1: Click the shortcut on the PC desktop, the following prompt message will pop up, meaning that the e-WriterPro version is not applicable to this software and needs to be updated before use.

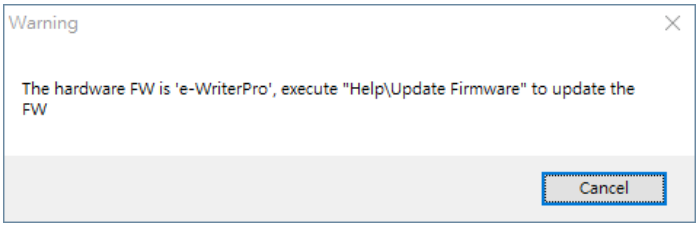

Figure 26

The following message informs users that Holtek has now released an updated version of the software which users can decide to update or not.

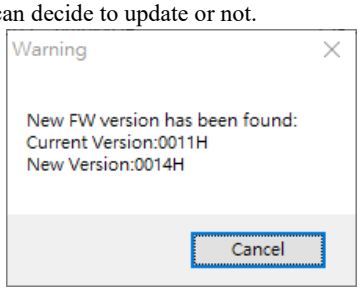

Figure 27

If not, click “Cancel”.

If yes, click the “Help” button at the upper right to select “Update Firmware” to execute an update.

Step2: Double-click “BC5161” in the “Device Selection” page. Users can now create new parameter setting values or use the pre-configured parameter files. Refer to Example 3.

Step3: If users want to create new parameter settings, click on “Download” in the “Chip Programming” page.

The “Select IC Package” window will pop up.

The BC5161 provides e-Sockets with both 8-pin and 16-pin types. Users can select the package type, either 16-pin QFN-A or 8-pin SOP-A, according to their specific requirements.

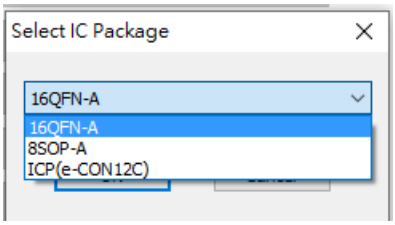

Figure 28

Holtek also provides an option for the ICP mode. Users can select this mode for direct On Board programming.

Step4: The programming can be initiated after the download operation has completed.

Example 5

Purpose: Use e-WriterPro and use Smart Programming for offline programming.

Tool: e-WriterPro + e-Socket - inserted into the e-WriterPro Line Pin.

Implement the above steps until the process arrives at the step to execute a “Download” in the “Chip programming” page.

Step1: Click “Smart Programming” in the “Chip Programming” page after which the following window will pop up.

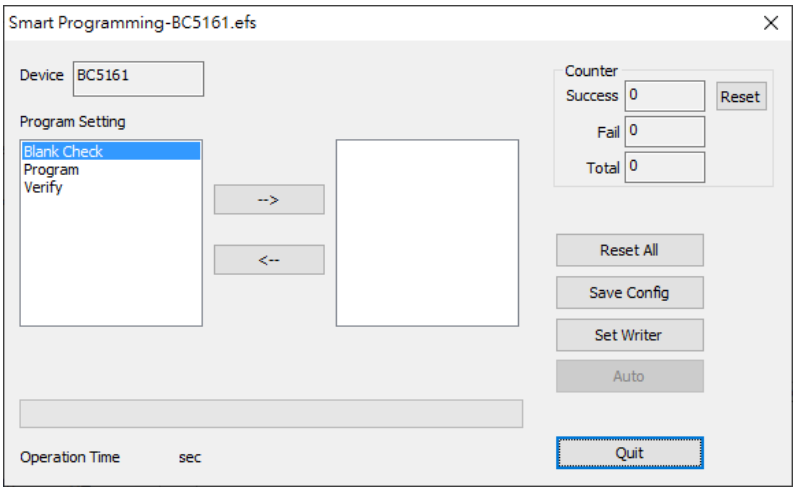

Figure 29

Step2: Select the “Blank Check” / “Program” / “Verify” options and add these options to the field on the right hand side. Click the “Save Config” followed by “Set Writer”. The “Auto” button will then be available for use after these actions have been implemented.

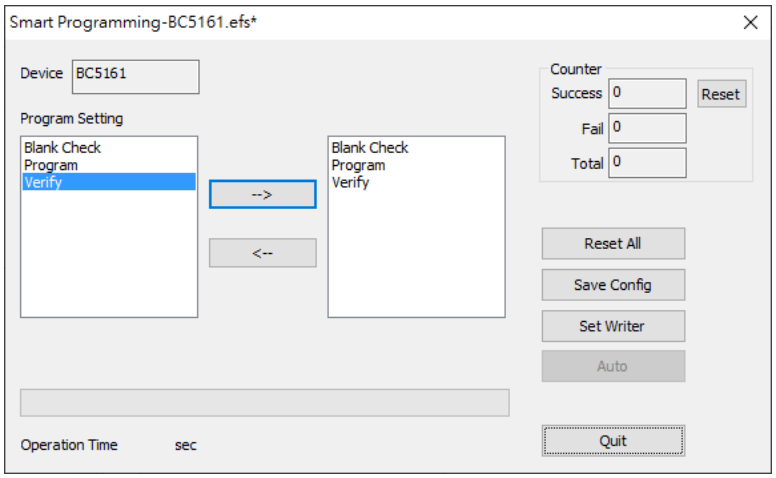

Figure 30

Step3: During programming, users can click on the “Auto” button or press the red button on the e-WriterPro directly to execute the functions selected in Step2. This example selects Blank Check, Program and Verify functions. After the execution has successfully completed, a “Success” prompt message will pop up.

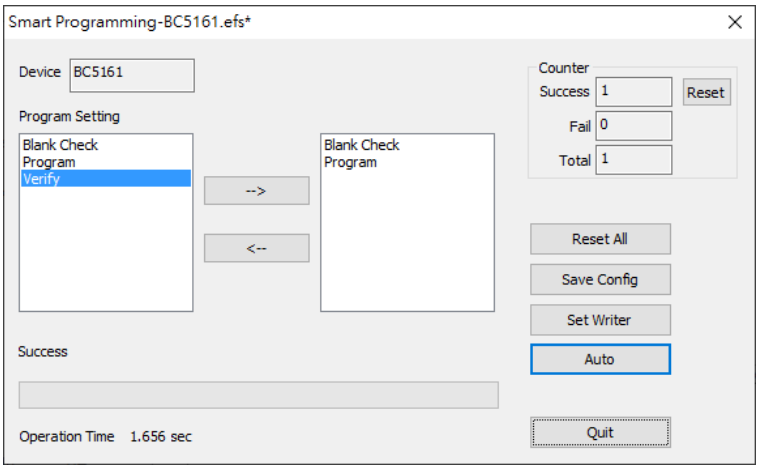

Figure 31

Step3-1: During programming, users can use the PC to execute programming or select offline programming as follows:

Connect the e-WriterPro to the Holtek Adapter and then connect the power supply. Then press the red button on the e-WriterPro directly to initiate offline programming.

Conclusion

This document has introduced how to use the Holtek BC5161 Fuse programming tools. If users have any related suggestions please contact Holtek.

Reference Files

Reference file: BC5161 Datasheet.

For more information, refer to the Holtek official website http://www.holtek.com/en.

Version and Modify Information

Date	Author	Issue
2020.10.13	何信智	V1.00

Disclaimer

All information, trademarks, logos, graphics, videos, audio clips, links and other items appearing on this website ('Information') are for reference only and is subject to change at any time without prior notice and at the discretion of Holtek Semiconductor Inc. and its related companies (hereinafter 'Holtek', 'the company', 'us', 'we' or 'our'). Whilst Holtek endeavors to ensure the accuracy of the Information on this website, no express or implied warranty is given by Holtek to the accuracy of the Information. Holtek shall bear no responsibility for any incorrectness or leakage.

Holtek shall not be liable for any damages (including but not limited to computer virus, system problems or data loss) whatsoever arising in using or in connection with the use of this website by any party. There may be links in this area, which allow you to visit the websites of other companies. These websites are not controlled by Holtek. Holtek will bear no responsibility and no guarantee to whatsoever Information displayed at such sites. Hyperlinks to other websites are at your own risk.

Limitation of Liability

In no event shall Holtek Limited be liable to any other party for any loss or damage whatsoever or howsoever caused directly or indirectly in connection with your access to or use of this website, the content thereon or any goods, materials or services.

Governing Law

The Disclaimer contained in the website shall be governed by and interpreted in accordance with the laws of the Republic of China. Users will submit to the non-exclusive jurisdiction of the Republic of China courts.

Update of Disclaimer

Holtek reserves the right to update the Disclaimer at any time with or without prior notice, all changes are effective immediately upon posting to the website.