

# KITPF3000FRDMPGM Evaluation Board

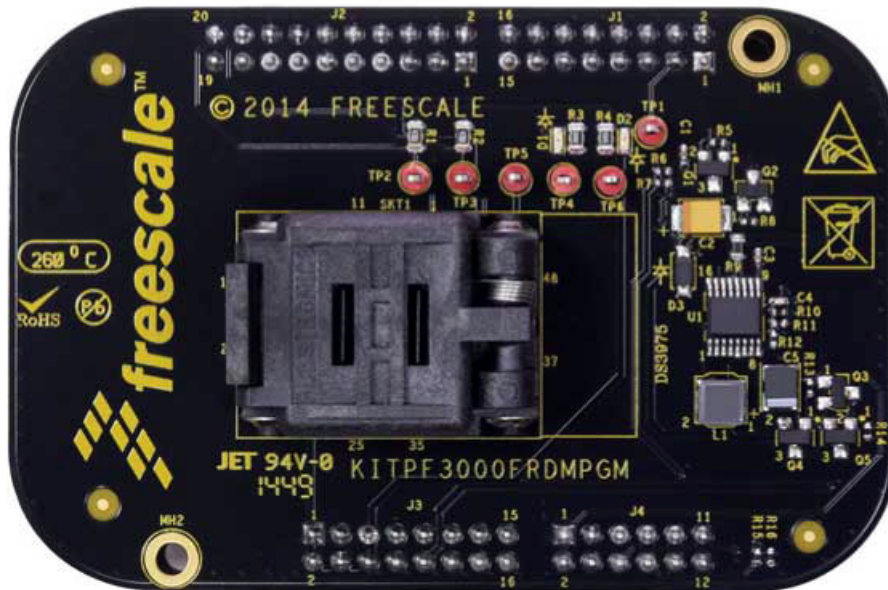


Figure 1. KITPF3000FRDMPGM

# Table of Contents

1 Important Notice .....	3
2 Getting Started .....	4
3 Getting to Know the Hardware .....	5
4 Installing the Software and Setting up the Hardware .....	7
5 Schematics, Board Layout and Bill of Materials .....	14
6 References .....	15
7 Revision History .....	16

# 1 Important Notice

Freescale provides the enclosed product(s) under the following conditions:

This evaluation kit is intended for use of ENGINEERING DEVELOPMENT OR EVALUATION PURPOSES ONLY. It is provided as a sample IC pre-soldered to a printed circuit board to make it easier to access inputs, outputs, and supply terminals. This evaluation kit may be used with any development system or other source of I/O signals by simply connecting it to the host MCU or computer board via off-the-shelf cables. Final device in an application will be heavily dependent on proper printed circuit board layout and heat sinking design as well as attention to supply filtering, transient suppression, and I/O signal quality.

The goods provided may not be complete in terms of required design, marketing, and or manufacturing related protective considerations, including product safety measures typically found in the end product incorporating the goods. Due to the open construction of the product, it is the user's responsibility to take any and all appropriate precautions with regard to electrostatic discharge. In order to minimize risks associated with the customers applications, adequate design and operating safeguards must be provided by the customer to minimize inherent or procedural hazards. For any safety concerns, contact Freescale sales and technical support services.

Should this evaluation kit not meet the specifications indicated in the kit, it may be returned within 30 days from the date of delivery and will be replaced by a new kit.

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## 2 Getting Started

### 2.1 Kit Contents/Packing List

The KITPF3000FRDMPGM contents include:

- Assembled and tested programming board with integrated FRDM-KL25Z functionality
- Quick Start Guide
- USB to Mini-USB Cable
- Warranty card

### 2.2 Jump Start

Freescale's analog product development boards help to easily evaluate Freescale products. These tools support analog mixed signal and power solutions including monolithic ICs using proven high-volume SMARTMOS mixed signal technology, and system-in-package devices utilizing power, SMARTMOS and MCU dies. Freescale products enable longer battery life, smaller form factor, component count reduction, ease of design, lower system cost and improved performance in powering state of the art systems.

- Go to [www.freescale.com/KITPF3000FRDMPGM](http://www.freescale.com/KITPF3000FRDMPGM)
- Review your Tool Summary Page
- Look for



- Download documents, software, and other information

Once the files are downloaded, review the user guide in the bundle. Jump start bundles with current versions of all relevant information are available on each tool summary page. The information in the bundles includes everything you need to begin designing.

### 2.3 Required Equipment and Software

To use this kit, you need:

- KITPF3000GUI installed on a PC running Windows 7, XP, Vista or 8 (32-bit or 64-bit)

### 2.4 System Requirements

The kit requires the following:

- USB-enabled PC with Windows® XP or higher

## 3 Getting to Know the Hardware

### 3.1 Board Overview

The KITPF3000FRDMPGM Evaluation Board (EVB) is an easy-to-use circuit board allowing the user to exercise all the functions of the PF3000 Power Management IC. The programming board integrates the popular FRDM-KL25Z board which serves as an interface between the GUI and the PF3000. Analog-to-Digital Convertors (ADCs) in the FRDM-KL25Z are used to monitor the regulator voltages through the GUI.

### 3.2 Board Features

The board features are as follows:

- Socket for PF3000 Power Management IC
- Integrated FRDM-KL25Z Freedom Board for monitoring and control through the PC
- Green LED to indicate power
- Red LED to indicate programming

### 3.3 Device Features

This programming board features the following Freescale product:

**Table 1. PF3000 Features**

Device	Description	Features
PF3000	Power Management Integrated Circuit (PMIC) for i.MX7 Series & i.MX 6 SL/SX	<ul style="list-style-type: none"> <li>• Four adjustable high efficiency buck regulators: 1.75 A, 1.5 A, 1.25 A, 1.0 A</li> <li>• 5.0 V, 600 mA boost regulator with PFM or Auto mode</li> <li>• Six adjustable general purpose linear regulators</li> <li>• Input voltage range: 2.8 V to 4.5 V or 3.7 V to 5.5 V</li> <li>• OTP (One Time Programmable) memory for device configuration</li> </ul>

## 3.4 Board Description

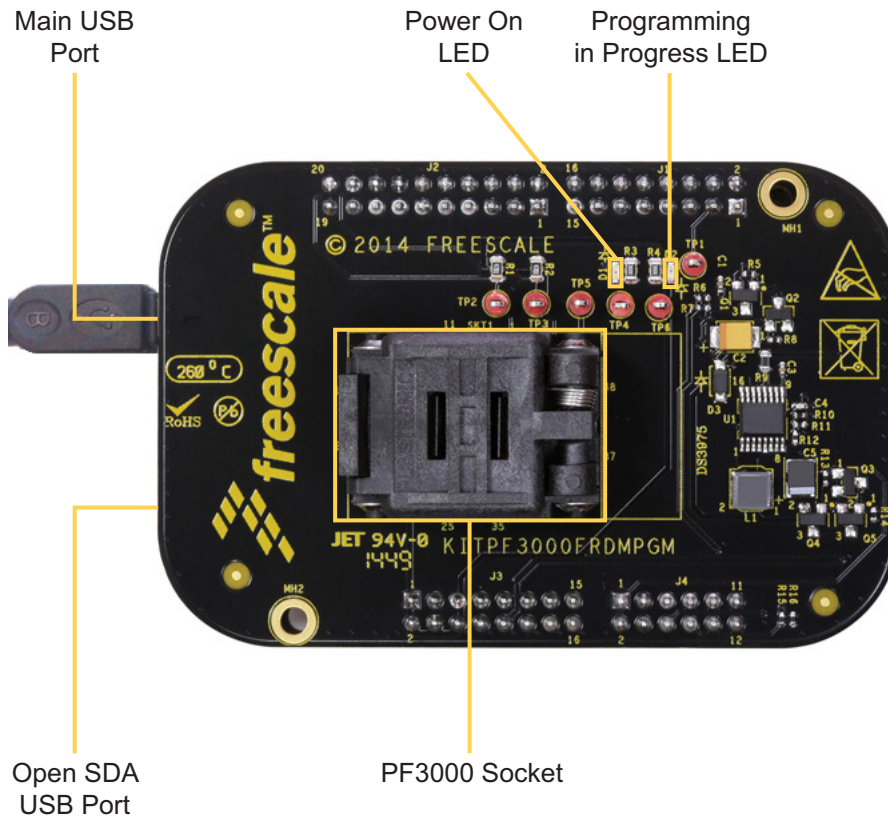


Figure 2. Board Description

Table 2: Board Description

Name	Description
Main USB port (USB KL25Z)	Provides power to the board. Connect your computer to this USB port in order to use the GUI software and program the PF3000.
OpenSDA Port (SDA)	Reserved for downloading firmware to the FRDM-KL25Z
PF3000 Socket	Insert a PF3000 part in this socket in order to program the device. Pin 1 is on the top right side.
Power On LED (Green)	Indicates the board is powered (3.3 V rail). Do not place or remove a part when this LED is ON.
Programming in Progress LED (Red)	Indicates the GUI is programming the part. Do not remove the part or disconnect the USB when this LED is ON.

# 4 Installing the Software and Setting up the Hardware

## 4.1 Installing PF3000GUI on your Computer

1. Download PF3000GUI.zip from [https://www.freescale.com/webapp/sps/site/prod\\_summary.jsp?code=KITPF3000FRDMPGM](https://www.freescale.com/webapp/sps/site/prod_summary.jsp?code=KITPF3000FRDMPGM).
2. Extract all the files to C:\Freescale\PF3000GUI or any other desired folder on your PC.
3. Run setup.exe and click on "Install" in the dialog box in [Figure 3](#).

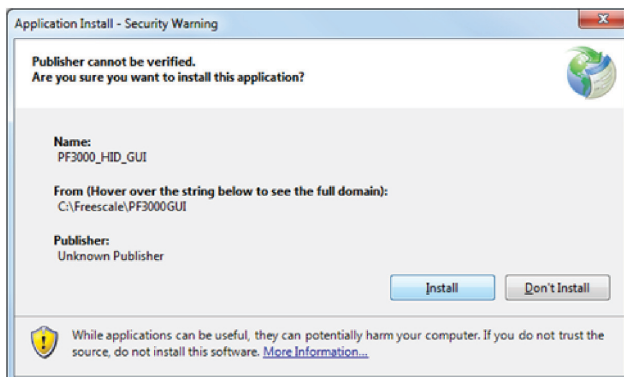


Figure 3. Install Dialog Box

4. The GUI installation is complete and the window shown in [Figure 4](#) appears. Do not click on anything until the board is plugged in.

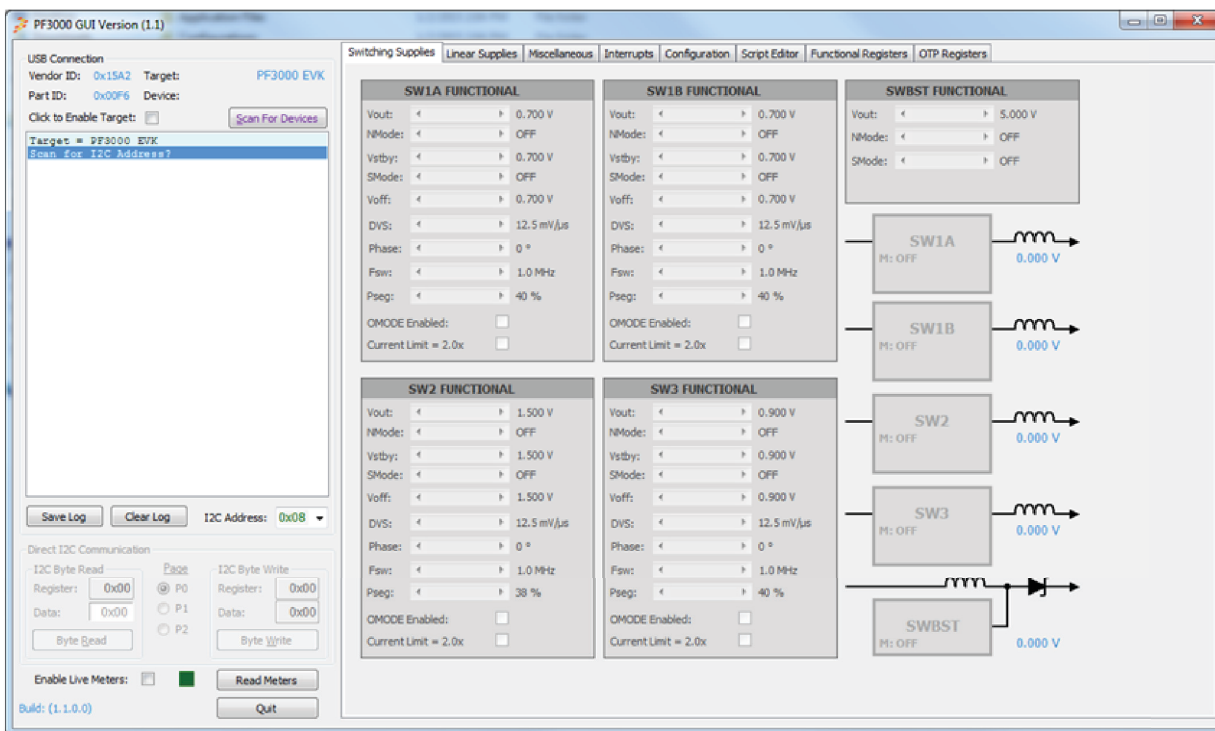
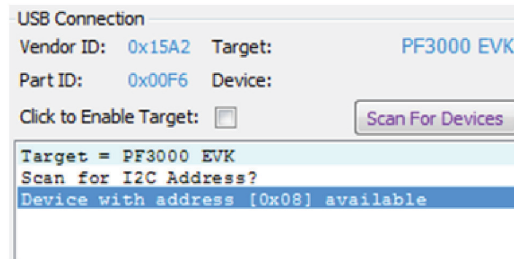


Figure 4. Installation Confirmation

## 4.2 Configuring the Hardware and using the GUI for Control and Monitoring

1. Plug the mini-USB side of the mini-USB to USB cable into the USBKL25Z port on the FRDM KL25Z board and the other end to an available USB port on the PC.
2. Windows will automatically install the necessary drivers. Wait for this to complete.
3. In the PF3000 GUI window, click on the "Scan For Devices" button in the top-left portion. A confirmation message indicating that a valid device is available appears. (See [Figure 5](#))



**Figure 5. Confirmation of Available Device**

4. Enable the communication by clicking the "Click to Enable Target" check box. You will immediately see the window turn from grey to color. The green LED on the FRDM-KL25Z also will turn on.
5. The GUI installation and hardware setup is now complete.



## 4.3 Understanding and Using the GUI

### 4.3.1 GUI Structure

Figure 6 shows the different components of the GUI.

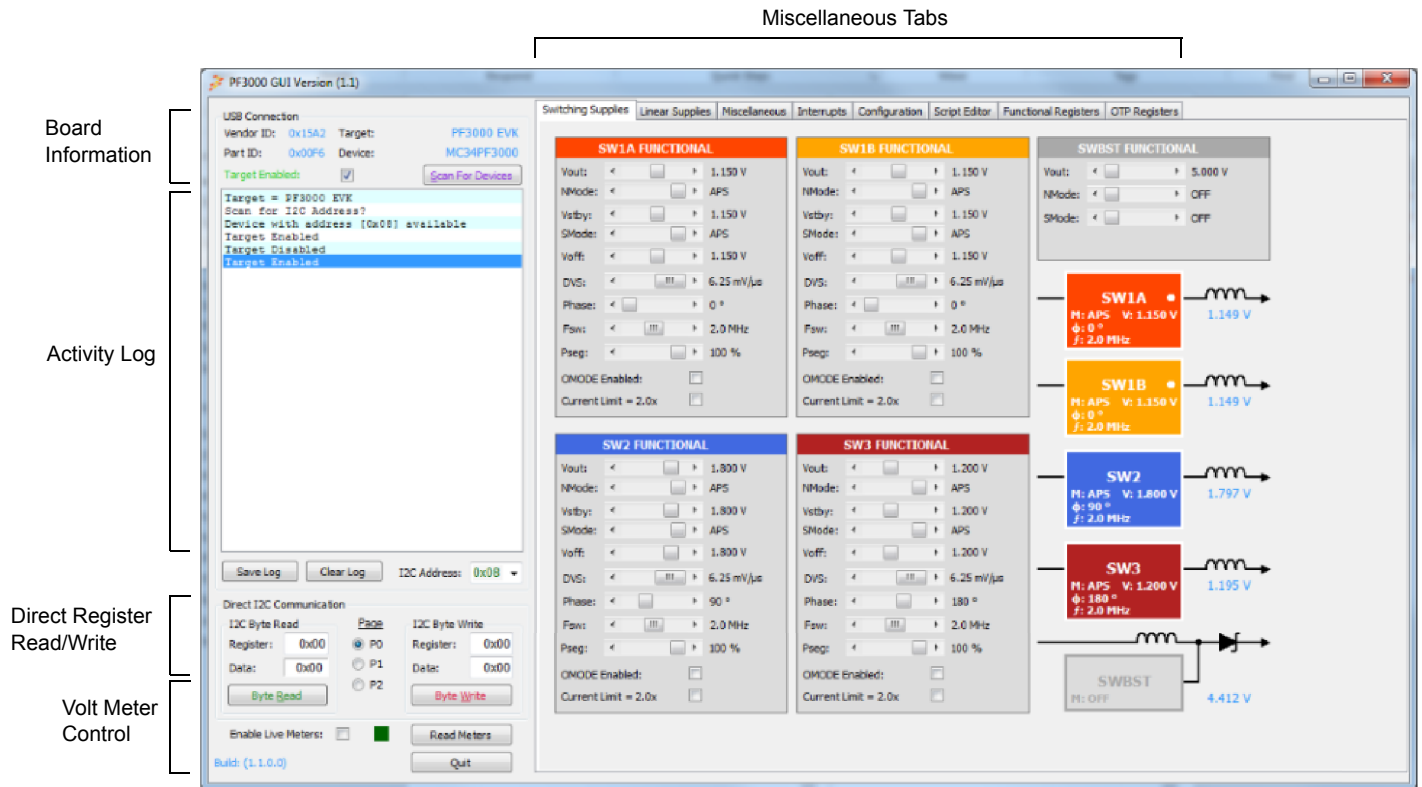


Figure 6. GUI Main Window

You are encouraged to explore the different tables, buttons and sliders in the various tabs of the GUI.

The KITPF3000FRDMPGM Programming board does not include external components for any switchers or linear regulators. Hence the Live Meters, Switching Supplies and Linear Supplies pages in the GUI cannot be used for evaluation.

### 4.3.2 Try-Before-Buy Mode using the “Configuration” Tab

The PF3000FRDMPGM comes with a PF3000 device whose OTP memory is pre-programmed. The PF3000 allows the user to override the OTP memory using the "Try-Before-Buy" mode.

To use this mode, go to the "Configuration" tab and click on the "Enter TBB Mode" button in the top-right of the window. Use the drop down options to change the voltage, sequence and configuration of the regulators. Click the "Update" button after all the desired options are selected.

To restart the PF3000 using the selected configuration, click on the "Restart PMIC" button. Alternatively, you can toggle the PWRON button to initiate the startup. The startup sequence can be monitored on an oscilloscope and will match this selection in the "Configuration" tab. To measure voltages, use either a stand-alone meter or the on-board meters available in the GUI.

Use the "Save Configuration" and "Load Configuration" buttons to save the configuration for later use.

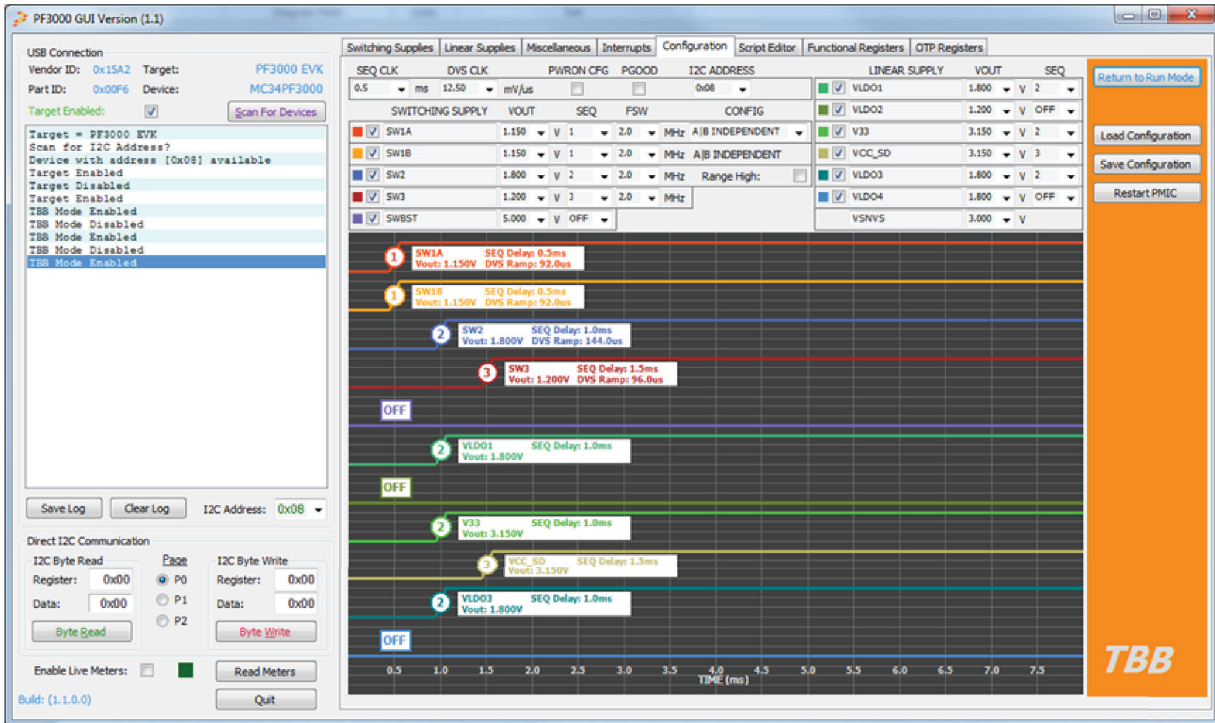


Figure 7. Try-Before-Buy Window

### 4.3.3 Programming the PF3000

1. The part provided with the board has already been programmed. Install a blank PF3000 part into the socket as shown in the picture below. Then, close the socket firmly.

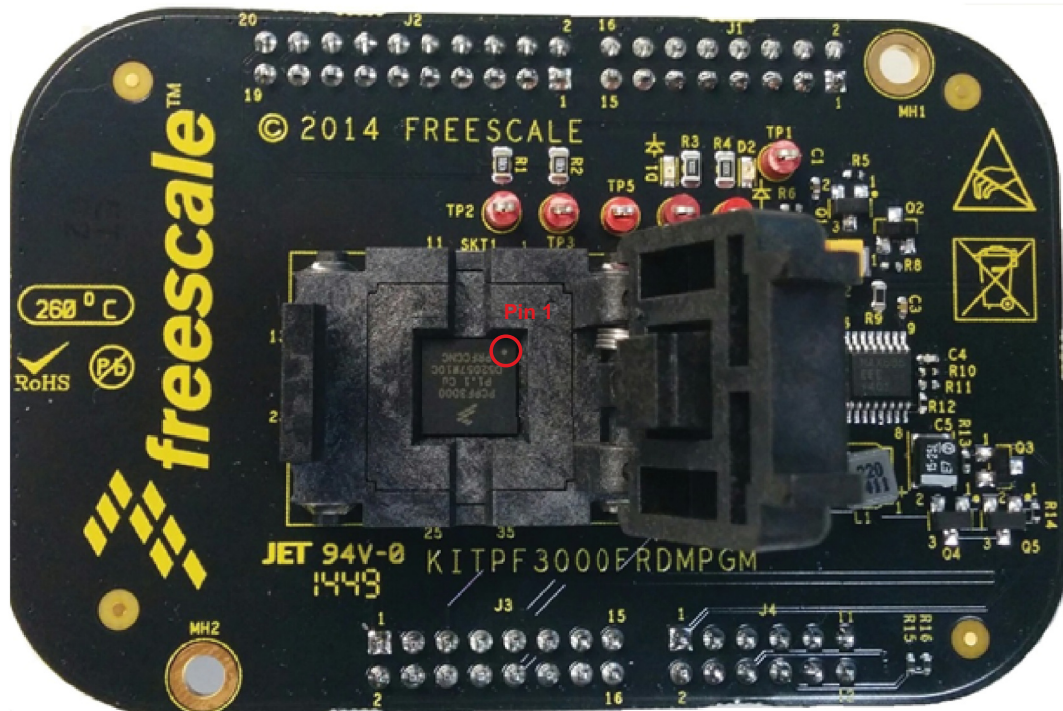


Figure 8. Installing the Device in the Socket

2. To power-up the board, connect the USB cable between your computer and the KL25Z USB port on the KITPF3000FRDMPGM evaluation board. The green LED on the EVB turns on when the board has powered up.
3. Launch the GUI by running "PF\_3000\_HID\_GUI." (For GUI installation instructions, see [Section 4.1 "Installing PF3000GUI on your Computer"](#).)

4. Click on the “Click to Enable Target” box to enable communication with the board.



Figure 9. Enable Target View

5. Click on the configuration tab and select “Enter TBB Mode.”
6. Click on “Edit Configuration” to manually modify parameters such as output voltage or sequencing. This feature is also called Try-Before-Buy (TBB)



Figure 10. Edit Configuration

7. When you have completed making modifications, click on “Return to Run Mode.”
8. You can save your configuration as a .cfg file (compatible with text editors) by clicking of the “Save Configuration button.
9. If you wish to use a previously saved configuration, click on “Load Configuration.” (The file you are loading must be in .cfg format.)

10. Once you are sure of your configuration, click on “PROGRAM.”

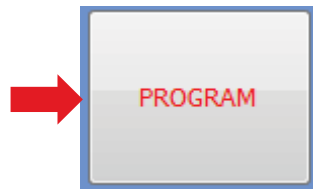


Figure 11. Program Button

### WARNING

The PF3000 in the socket can only be programmed once. Be sure your configuration is correct before clicking the “PROGRAM” button.

11. After programming completes, look at the last line of the log window. If it shows no errors, your PF3000 device has been programmed successfully.

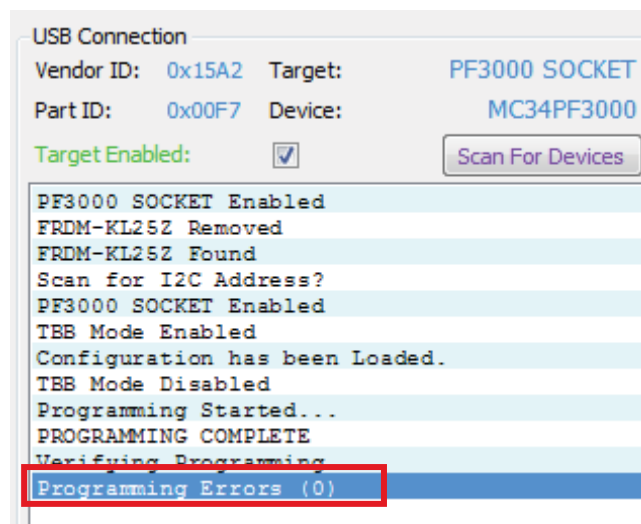


Figure 12. Successful Programming View

12. Unplug the USB cable. You are now ready to start using your device on a full-featured application board.

## 5 Schematics, Board Layout and Bill of Materials

KITPF3000FRDMPGM board schematics, board layout, and bill of materials are available in the Download section of the KITPF3000FRDMPGM Product Summary page at the following url:

[http://www.freescale.com/webapp/sps/site/prod\\_summary.jsp?code=KITPF3000FRDMPGM](http://www.freescale.com/webapp/sps/site/prod_summary.jsp?code=KITPF3000FRDMPGM)

## 6 References

Following are URLs where you can obtain information on related Freescale products and application solutions:

Freescale.com Support Pages	Description	URL
KITPF3000FRDMPGM	Tool Summary Page	<a href="http://www.freescale.com/webapp/sps/site/prod_summary.jsp?code=KITPF3000FRDMPGM">http://www.freescale.com/webapp/sps/site/prod_summary.jsp?code=KITPF3000FRDMPGM</a>
	Schematic, BOM, Board Layout	<a href="http://www.freescale.com/webapp/sps/site/prod_summary.jsp?code=KITPF3000FRDMPGM">http://www.freescale.com/webapp/sps/site/prod_summary.jsp?code=KITPF3000FRDMPGM</a> (Download Section)
PF3000	Product Summary Page	<a href="http://www.freescale.com/webapp/sps/site/prod_summary.jsp?code=PF3000">http://www.freescale.com/webapp/sps/site/prod_summary.jsp?code=PF3000</a>
FRDM-KL25Z	Freescale Freedom Development Platform	<a href="http://www.freescale.com/webapp/sps/site/prod_summary.jsp?code=FRDM-KL25Z">http://www.freescale.com/webapp/sps/site/prod_summary.jsp?code=FRDM-KL25Z</a>

### 6.1 Support

Visit [www.freescale.com/support](http://www.freescale.com/support) for a list of phone numbers within your region.

### 6.2 Warranty

Visit [www.freescale.com/warranty](http://www.freescale.com/warranty) for a list of phone numbers within your region.

## 7 Revision History

Revision	Date	Description of Changes
1.0	6/2015	• Initial Release





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