

UM11898

KITPF5300SKTEVM Evaluation board

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User manual



Document Information

| Information | Content |
|-------------|---|
| Keywords | Safety, SBC, automotive, low power, ASIL D, industrial |
| Abstract | This document is the user guide for the KITPF5300SKTEVM evaluation board. |



Revision history

| Revision | Date | Description |
|----------|----------|-----------------|
| v.1 | 20230609 | initial version |

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1 Introduction

This document is the user guide for the KITPF5300SKTEVM evaluation board. It is intended for engineers involved in the evaluation, design, implementation, and validation of the PF5300.

This document covers connecting the hardware, installing the software and tools, configuring the environment, and using the kit.

2 Finding kit resources and information on the NXP website

NXP Semiconductors provides online resources for this evaluation board and its supported device(s) on <http://www.nxp.com>.

The information page for the KITPF5300SKTEVM evaluation board is at <http://www.nxp.com/KITPF5300SKTEVM>. The information page provides overview information, documentation, software and tools, parametrics, ordering information and a **Getting Started** tab. The **Getting Started** tab provides quick-reference information applicable to using the KITPF5300SKTEVM evaluation board, including the downloadable assets referenced in this document.

3 Getting ready

Working with the KITPF5300SKTEVM requires the kit contents, additional hardware, and a Windows PC workstation with installed software.

3.1 Kit contents

- Assembled and tested evaluation board and preprogrammed FRDM-KL25Z microcontroller
- 3.0 ft USB-STD A to USB-B-mini cable
- Jumpers mounted on board

3.2 Additional hardware

In addition to the kit contents, the following hardware is necessary or beneficial when working with this kit.

- Power supply with a range of 3.3 V to 5.0 V

3.3 Minimum system requirements

This evaluation board requires a Windows PC workstation. Meeting these minimum specifications should produce great results when working with this evaluation board.

- USB-enabled computer with Windows 7 or Windows 10

3.4 Software

The software listed here must be installed before working with this evaluation board.

- NXP GUI installation package

4 Getting to know the hardware

The KITPF5300SKTEVM provides a way to OTP programming the PF5300 and conduct basic power-up testing of a programmed part. Loading of the DC-DC converter is not allowed.

4.1 Board features

- VIN and PVIN connectors
- SW1 output capability up to 15 A
- Load slammer connector
- PGOOD output
- Emulation mode capabilities
- USB connection and GUI for register access, OTP emulation, and programming

4.2 Kit featured components

[Figure 1](#) identifies important components on the board and [Table 1](#) provides additional details about these components.

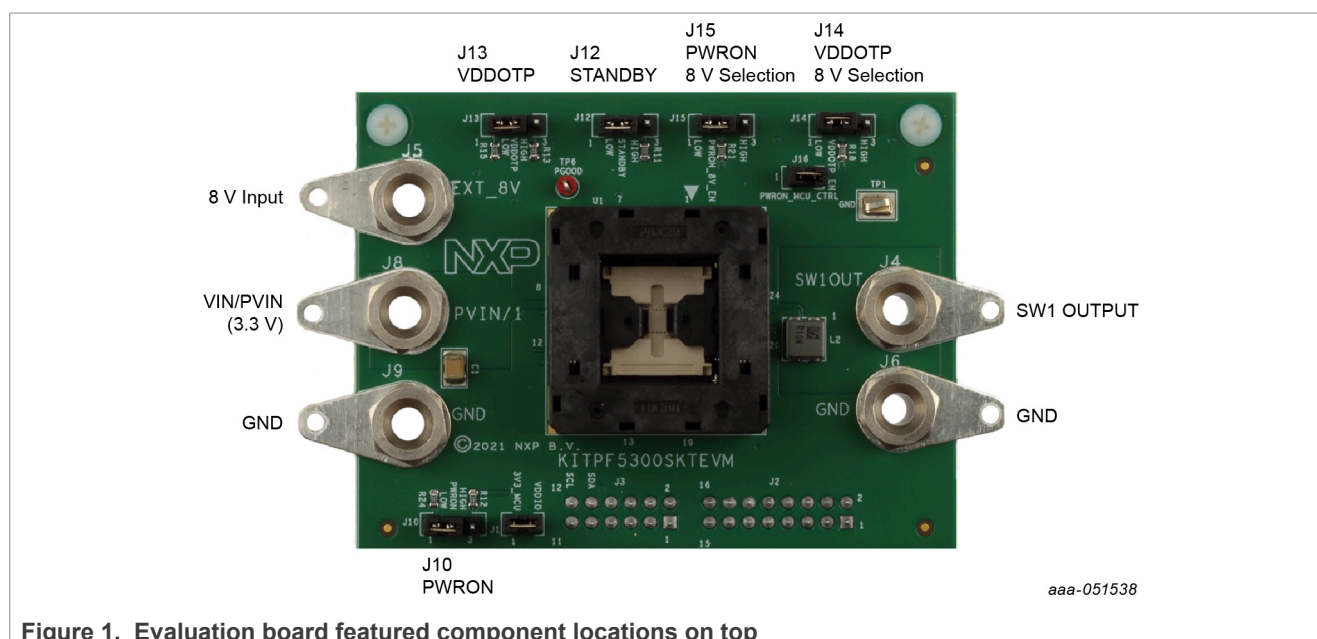


Figure 1. Evaluation board featured component locations on top

Table 1. Connector and jumper description

| Position | Function | Description |
|----------|-----------------------------|--|
| J5 | EXT_8V | 8 V supply input needed for OTP programming |
| J8 | VIN/PVIN | Input power supply (3.3 V) |
| J9, J6 | GND | Ground |
| J4 | Output Voltage | Output Voltage |
| J12 | STANDBY | 1-2: Default . STANDBY = GND 2-3: STANDBY = VDDIO |
| J10 | PWRON Functional Control | Open: Default . PWRON controlled through J16. 1-2: PWRON = GND 2-3: PWRON = VDDIO Use only if J16 is open. |
| J13 | VDDOTP Configuration | Open: Default . Use for OTP programming. 1-2: Connect to ground. 2-3: Pull up to VDDIO. Use if trying XFAILB functionality |
| J14 | VDDOTP 8V Selection | 1-2: Do not apply EXT_8V to VDDOTP/XFAILB pin 2-3: Default . Apply 8V_EXT to VDDOTP/XFAILB pin Open: If evaluating XFAILB functionality |
| J15 | PWRON Configuration | Control PWRON voltage in relation to EXT_8V 1-2: Apply EXT_8V/2 to PWRON pin 2-3: Default . Apply EXT_8V to PWRON pin |
| J16 | PWRON Connectivity | Open: PWRON controlled by J10 Closed: Default . PWRON controlled by J15/MCU. |
| J1 | VDDIO supply | Closed: Default |

4.3 Schematics, board layout, and bill of materials

The board schematics, board layout, and bill of materials are available at <http://www.nxp.com/KITPF5300SKTEVM> on the Overview tab under Get Started.

5 Installing and configuring software tools

5.1 Flashing or updating the GUI firmware

The KITPF5300SKTEVM is always delivered with the GUI firmware already flashed. If the MCU firmware is already flashed, the user can ignore this section. If it is specified that the user needs to update the firmware or if the firmware is malfunctioning, follow these instructions:

5.1.1 Flashing Freedom Board evaluation board firmware for Windows 7

Steps 1 and 2 are not required if **BOOTLOADER** is already loaded in the KITPF5300SKTEVM board. In that case, start from step 3.

1. Press the **RST** button and connect the USB cable into the SDA port on the Freedom board
 - A new **BOOTLOADER** device should appear on the left pane of the Windows Explorer
2. Drag and drop the file *MSD-DEBUG-FRDM-KL25Z_Pemicro_v118.SDA* into the **BOOTLOADER** drive

Note: Make sure to allow enough time for the firmware to be saved in the **BOOTLOADER**

3. Disconnect and reconnect the USB cable into the SDA port
 - This time, without pressing the **RST** button, the FRDM_KL25Z device should appear on the left pane of the Windows File Explorer as pictured in [Figure 2](#).

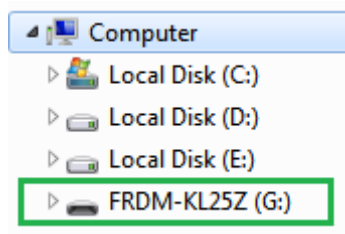


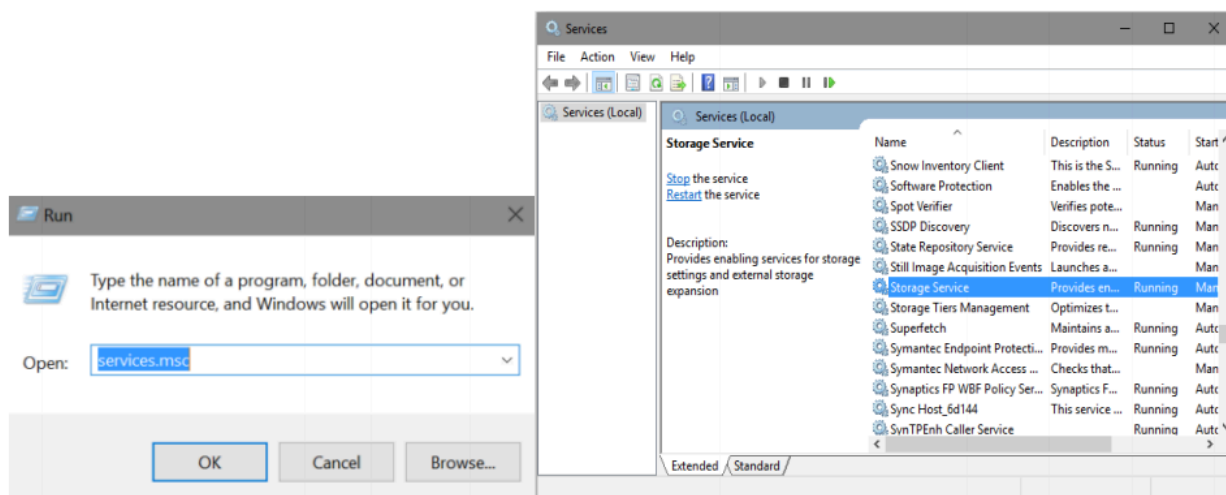
Figure 2. Left pane of Windows Explorer

4. Locate the file `nxp-gui-fw-frdmkl25z-usb_hid-pf5300_v0.3.bin` (or later version) from the package, and drag and drop the file into the FRDM_KL25Z device.

Note: Make sure to allow enough time for the firmware to be saved
5. The Freedom board firmware is successfully loaded. Disconnect and reconnect the USB cable to the KL25Z USB port.

5.1.2 Flashing Freedom Board evaluation board firmware for Windows 10

1. Disable the storage services: Run the **Services**, double click on **Storage Service** from the resulting list, and press the **Stop** button.



Steps 2 and 3 are not required if **BOOTLOADER** is already loaded in the KITPF5300SKTEVM board. In that case, start from step 4.

2. Press the **RST** button and connect the USB cable to the SDA port on the Freedom board.
 - A new **BOOTLOADER** device appears on the left pane of the Windows File Explorer.
3. Drag and drop the file `MSD-DEBUG-FRDM-KL25Z_Pemicro_v118.SDA` into the **BOOTLOADER** drive.

Note: Make sure to allow enough time for the firmware to be saved in the **BOOTLOADER**.
4. Disconnect and reconnect the USB cable to the SDA port.
 - This time without pressing the **RST** button, the FRDM_KL25Z device should appear on the left pane of the Windows File Explorer as pictured in [Figure 3](#).

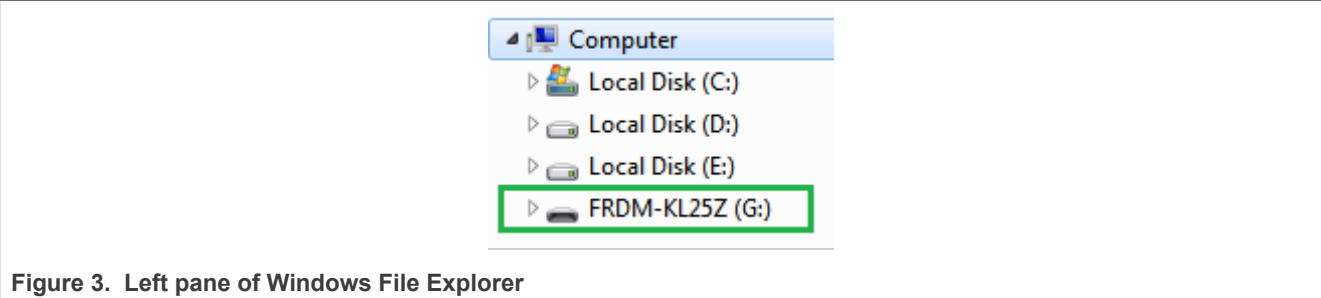


Figure 3. Left pane of Windows File Explorer

- 5. Locate the file `nxp-gui-fw-frdmkl25z-usb_hid-pf5300_v0.3` (or later version) from the package, and drag and drop the file into the FRDM_KL25Z device.
Note: Make sure to allow enough time for the firmware to be saved.
- 6. The Freedom board firmware is successfully loaded. Disconnect and reconnect the USB cable to the FRDM-KL25Z microcontroller USB port.

5.2 Installing the GUI software package

Once the KIT is ready and the NXPGUI_Dev is installed, launch the KIT from your windows search bar and click to launch.

To install the PF5300 NXP GUI, download or obtain the NXPGUI package, unzip, and open the **1-NXP_GUI_Setup** folder:

| Name | Status | Date modified | Type | Size |
|-------------------|--------|-------------------|---------------|------|
| 0 - Documentation | ✓ | 6/8/2020 10:57 AM | File folder | |
| 1 - NXP_GUI_Setup | 🔄 | 6/8/2020 5:26 PM | File folder | |
| 2 - KL25Z_FW | ✓ | 6/4/2020 1:42 PM | File folder | |
| LICENSE.txt | ✓ | 6/4/2020 11:14 AM | Text Document | 3 KB |

Double click on the setup file and follow the instructions.
When installation is finished, search the application on the windows search bar as “NXPGUI_Dev”.

6 PF5300 NXP GUI

Once the kit is ready and the **NXPGUI** software is installed, use the Windows search bar to find the GUI. Click the search result to launch it.
Once the NXP GUI is opened and the kit selection window shown in [Figure 4](#) is displayed, check for the following settings and click **OK**.

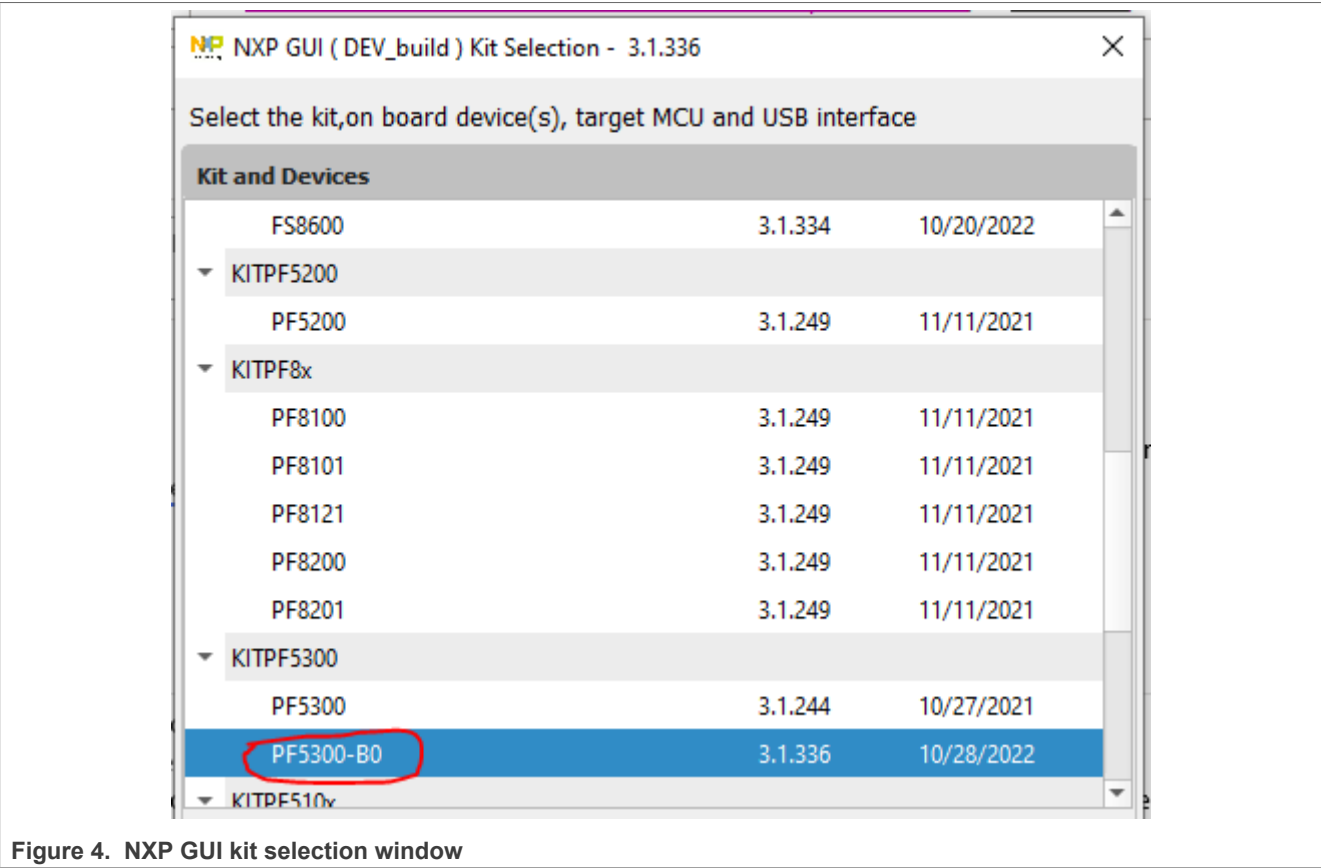


Figure 4. NXP GUI kit selection window

Note: To avoid the kit selection window on every launch, check the box *Use this configuration and do not ask again*.

The window shown in [Figure 5](#) opens.

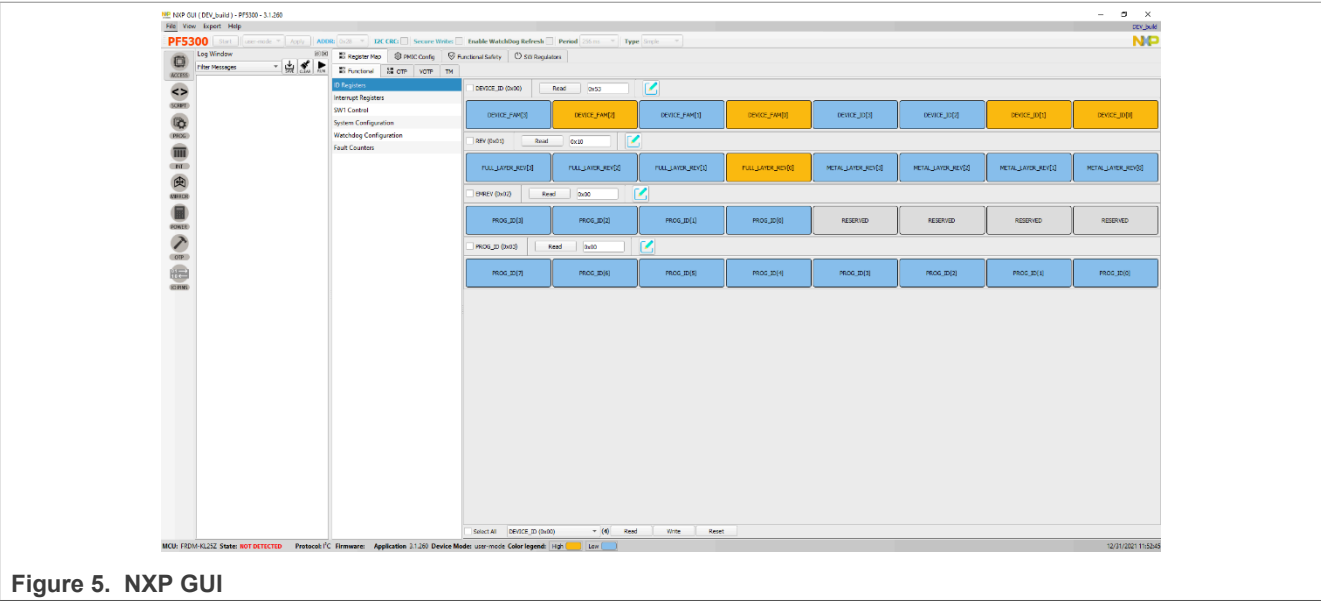


Figure 5. NXP GUI

7 Configuring the hardware

Once the user has installed the NXP GUI, follow these instructions to quickly power up the board.

Powering up the board with pre-programmed OTP configuration

1. Make sure that the board has the right jumper configuration per [Table 1](#) and [Figure 6](#).
2. Ensure that SW4 is in the NORMAL position.
3. Verify that the FRDM-KL25Z microcontroller is plugged in, and the USB cable on the FRDM-KL25Z microcontroller USB connector side is attached. It is important that the USB cable is connected to a PC, because the cable enables communication with the NXP GUI and provides the VDDIO reference for the IC.
4. Apply VIN and PVIN with PWRON = 0.
5. Move J10 from 1-2 to 2-3 to turn on the PF53.
6. Open the GUI and communicate as required.

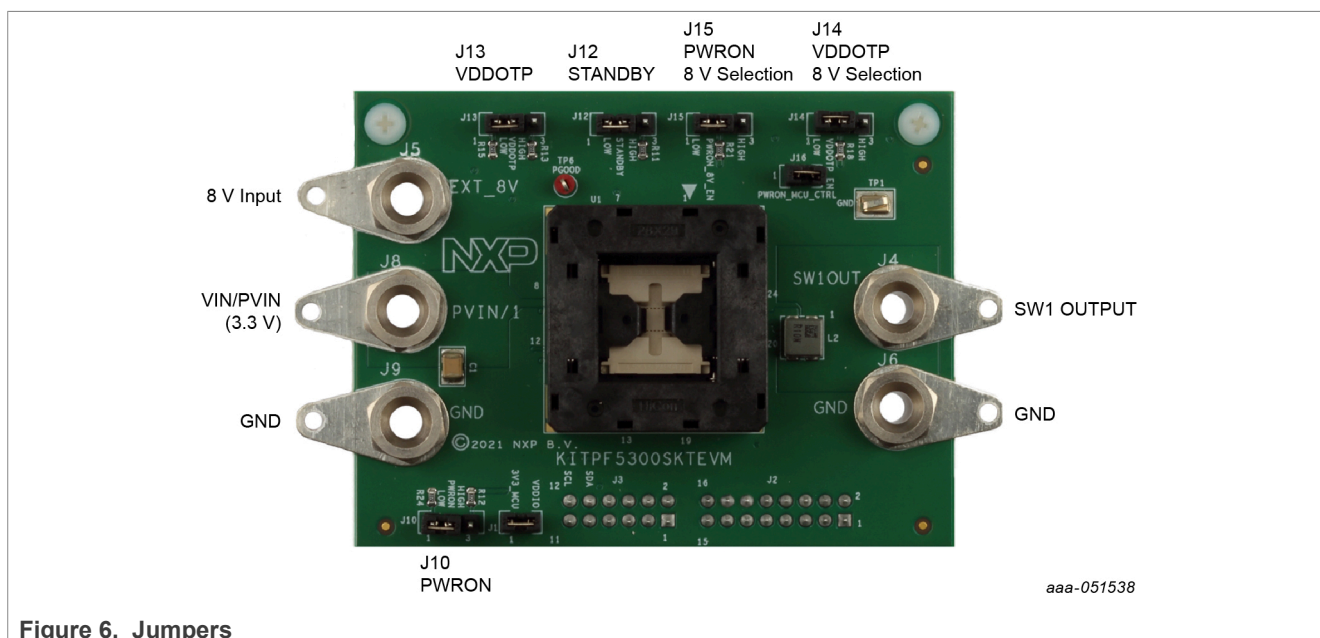
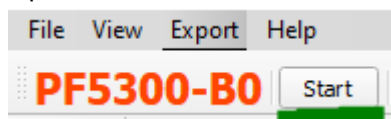


Figure 6. Jumpers

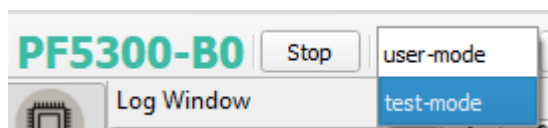
Powering up the board in Debug mode

Debug mode allows the user to modify OTP mirror registers before powering up. This facilitates exercising different features of the PF5300 while deciding on the best configuration for a given application.

1. Ensure that jumpers in the board are configured per [Table 1](#)
2. Connect the FRDMKL25Z board to the socketed board.
3. Connect the mini-USB cable from the USB port of the KL25Z to the PC that will run the GUI
4. Apply 8 V to the EXT_8V connector J5.
5. Apply 3.3 V to the VIN/PVIN connector J8
6. Open the GUI and click **Start** in the top-left



7. Select **Test Mode** from the menu selection as shown below, then click **Apply**.



8. Go to the PROG tab in the left side selection
9. Select the programming source – either from a script file, or to use the existing GUI configuration
10. Click on the **Program** button to program the OTP fuses with the selected configuration.

To verify functionality of the programmed part:

1. Turn off EXT_8V.
2. Move J15 to 1-2.
3. Apply EXT_8V and check the output voltage.

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