UM12379

SBC and PMIC product OTP programming board user manual

Rev. 1.0 — 8 January 2026 User manual

Document information

Information	Content
Keywords	PMICs, OTP-programmer, programming kit
Abstract	This document describes how to setup the PMIC-OTP programming kit, and how it can work with the NXP GUI.

1 Introduction

This document is the user guide for the PMIC-OTP programming kit. The kit itself is intended to program NXP SBC or PMIC devices for samples of customer prototype build. To support multiple selection of SBC and PMIC devices. The kit consists of a mother board and set of daughter boards.

Table 1 shows the current daughter and mother board combo supported.

Table 1. Device support

PMIC device	PMIC-OTP-DB	Device Link
PF81/PF82	PF8200-OTP-DB	http://www.nxp.com/PF8100-PF8200
VR5510	VR5510-OTP-DB	https://www.nxp.com/products/VR5510
FS2400	FS24-OTP-DB	https://www.nxp.com/products/FS24
FS2300/FS2320	FS23-OTP-DB	https://www.nxp.com/products/FS23
FS26	FS26-OTP-DB	https://www.nxp.com/products/FS26
FS5600	FS5600-OTP-DB	https://www.nxp.com/products/FS5600
FS84	FS85-OTP-DB	https://www.nxp.com/products/FS84
FS85	FS85-OTP-DB	https://www.nxp.com/products/FS85
PF5020	PF5020-OTP-DB	https://www.nxp.com/products/PF5020
PF5024	PF5020-OTP-DB	https://www.nxp.com/products/PF5024
PF5023	PF5020-OTP-DB	https://www.nxp.com/products/PF5023

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2 Finding kit resources and information on the NXP web site

The scope of this document is to provide the user with how to program a PMIC product using the programming kit. How it works in tangent with the existing NXP GUI using the IHEX file.

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

The information page for the PMIC-OTP programming board is at https://www.nxp.com/PMIC-OTP-MB. The information page provides overview information, documentation, software and tools, parametric, ordering information, and a Getting Started tab. The Getting Started tab provides quick-reference information applicable to using the PMIC-OTP programming board, including the downloadable assets referenced in this document.

3 Getting ready

Working with the programming kit requires:

- A PMIC-OTP-MB
- A PMIC-DB
- A USB-Type A to USB-Type C cable
- A Windows PC workstation with installed software

3.1 Kit contents

CAUTION

This device is sensitive to ElectroStatic Discharge (ESD). Therefore care should be taken during transport and handling. You must use a ground strap or touch the PC case or other grounded source before unpacking or handling the hardware.

- Mother board: preprogrammed PMIC-OTP-MB in an anti-static bag and a USB-STD A to USB-Type C cable
- Daughter board: socket board in an anti-static bag

3.2 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 2.0 or above

3.3 Software

Installing software is necessary to work with this evaluation board. All listed software is available on the evaluation board's information page at https://www.nxp.com/PMIC-OTP-MB.

In addition, the mother board is created in reference to the KL25Z freedom board with the OpenSDA connection. Visit www.pemicro.com/opensda for the OpenSDA driver.

Download and extract the GUI. The GUI can be directly opened with the .exe file.

User might also download the universal GUI for NXP's Automotive PMIC products when generating the related IHEX file. Download the GUI here: NXP GUI for Automotive PMIC Families

4 Getting to know the hardware

The OTP programming boards provide an easy-to-use platform for programming SBC and PMIC products. The boards support all voltages and signals needed for OTP programming.

4.1 Kit overview

The PMIC-OTP programming kit features a mother board with on board power supply and communication ports. It allows the customer to program a variety of SBC and PMIC devices by connecting it with different socket daughter boards.

4.2 Board features

OTP programming mother board

- 5.0 V operating input voltage range (from USB connector)
- Integrated power system to supply both VDDOTP and Vin for SBC products
- USB to I^2C or SPI communication via the KL25 MCU
- Inline programming interface connector

OTP programming daughter board

- Options for purchasing different socket daughter boards
- LED for showing device power on and being programmed

4.3 Block diagram

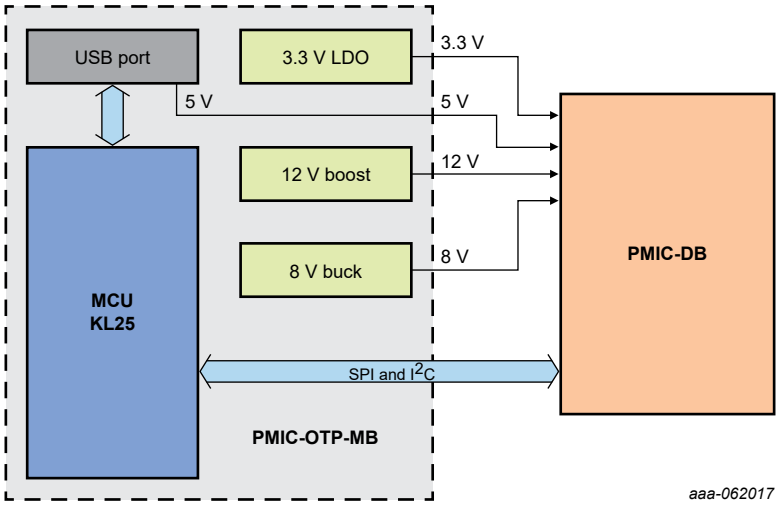
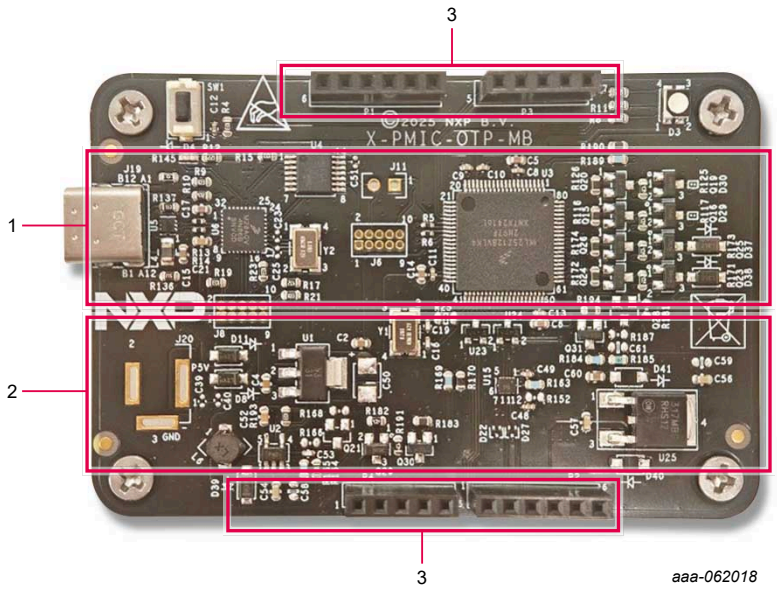


Figure 1. Block diagram

4.4 Kit featured components

Figure 2 identifies important components on the mother board.



1. KL25 MCU and OpenSDA circuit with Type-C port
2. On board power system
3. Daughter board connector

Figure 2. PMIC-OTP-MB featured components location

4.5 Schematic, board layout and bill of materials

The schematic, board layout, and bill of materials for are available at https://www.nxp.com/PMIC-OTP-MB

5 Installing and configuring software tools

5.1 Downloading the GUI

Follow the steps to download the GUI:

1. Sign in the NXP website and Download the Zip file at https://www.nxp.com/PMIC-OTP-MB/Software. The Zip file is downloaded to the location selected.
2. Unzip the file to find the OTP_Programmer.exe
3. Double-click the **OTP_Programmer.exe** to open the GUI
4. Select the device you wish to program and connect

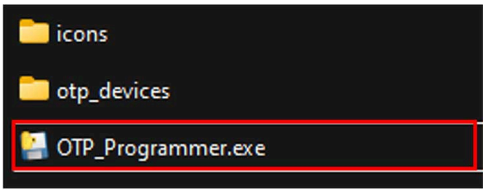


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Figure 3. OTP_Programmer.exe

Note: *If the connect button does not work, check if you have the required driver installed.*

5. Click the **Load** button to load the IHEX file

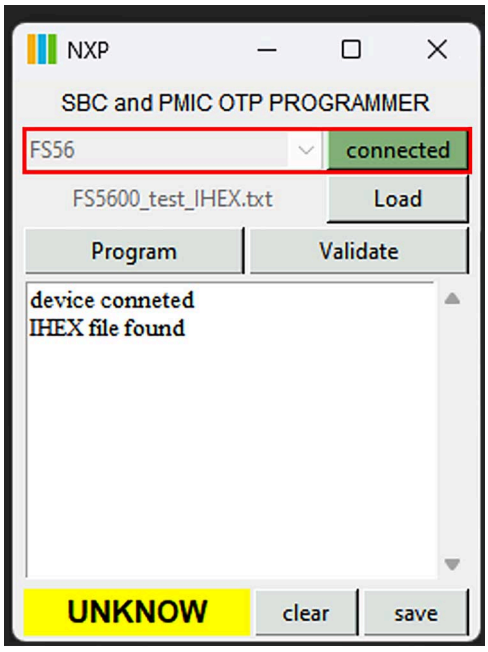

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Figure 4. SBC and PMIC OTP programmer

6 Configuring the hardware and software

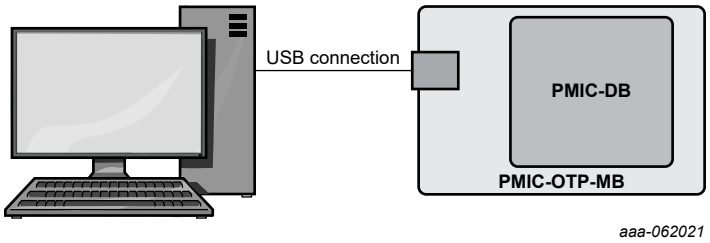

Figure 5. Hardware configuration

Figure 5 presents a typical hardware configuration incorporating the development board, power supply, and Windows PC workstation.

Follow the steps to configure the hardware and workstation as illustrated in Figure 5:

1. Plug the PMIC-DB on top of the PMIC-OTP-MB. Make sure no connect is left open.
2. Connect the USB cable from the PC to the USB port on the mother board. Make sure to use at least a USB 2.0 on the PC port side.

7 Getting OTP configuration IHEX file

The following is an example of how to get the OTP IHEX file for programming.

7.1 Downloading the IHEX file directly

Before configuring a new OTP, go to the NXP web site to check the comparison table and search for the standard OTP parts of the device.

For example, in the PF8100 product webpage, various OTP config can be downloaded directly. User can download and load the IHEX file to PMIC-OTP programmer for programming.

Part Number	Description	OTP ID*	Safety Grade	Package
MC33PF8100CC	i.MX8QXP	CC report, programming and configuration files	QM	HVQFN56
MC33PF8100CF	i.MX8QXP	CF report, programming and configuration files	QM	HVQFN56
MC33PF8100CH	i.MX8QM	CH report, programming and configuration files	QM	HVQFN56
MC33PF8100EA	LS1046A	EA report, programming and configuration files	QM	HVQFN56
MC33PF8100EP	i.MX8QM	EP report, programming and configuration files	QM	HVQFN56
MC33PF8100EQ	i.MX8QM	EQ report, programming and configuration files	QM	HVQFN56
MC33PF8100ER	i.MX8QM	ER report, programming and configuration files	QM	HVQFN56
MC33PF8100F3	i.MX8QXP	F3 report, programming and configuration files	QM	HVQFN56
MC33PF8100FJ	LA1575	FJ report, programming and configuration files	QM	HVQFN56

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Figure 6. Comparison table

7.2 Generating IHEX file via NXP GUI

7.2.1 Downloading the GUI

Follow the steps to download the GUI:

1. Sign in the NXP web site and open NXP GUI for Automotive PMIC Families
2. Download the Zip files
3. Read the GUI license agreement, if everything is okay, accept that. The download starts to the location selected.
4. Unzip the file and open to find the GUI folders as below:

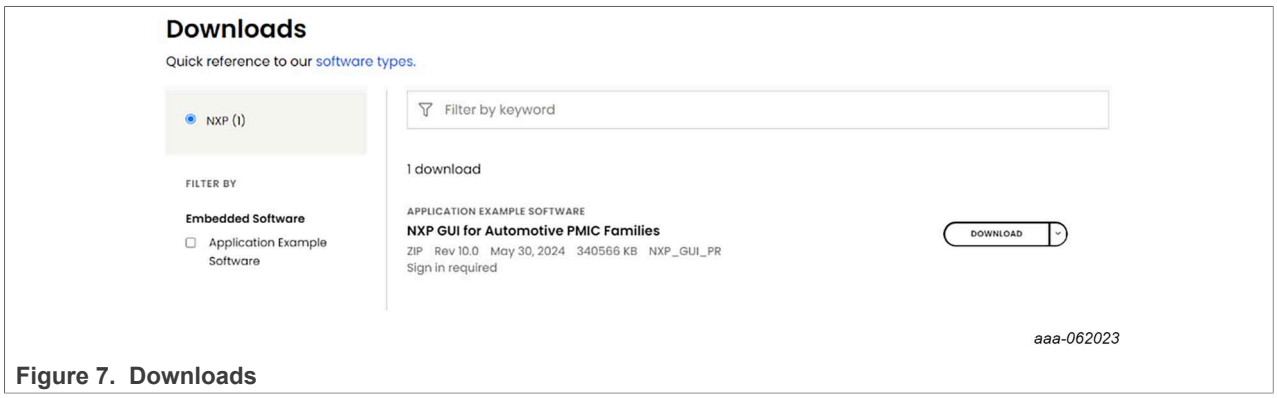

Figure 7. Downloads

5. Open the NXP_GUI_Setup folder and click the **NXP_GUI-10.0.0-Setup.exe** file to install the GUI in the PC

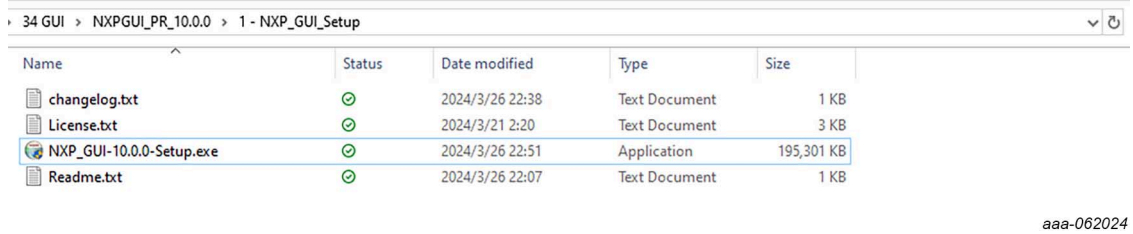

Figure 8. NXP_GUI_Setup folder

6. When the installing is finished, open the GUI to find the GUI interface which integrates nearly all the NXP Auto PMICs products.
7. Select the product name needed to program. For example, PF8100:

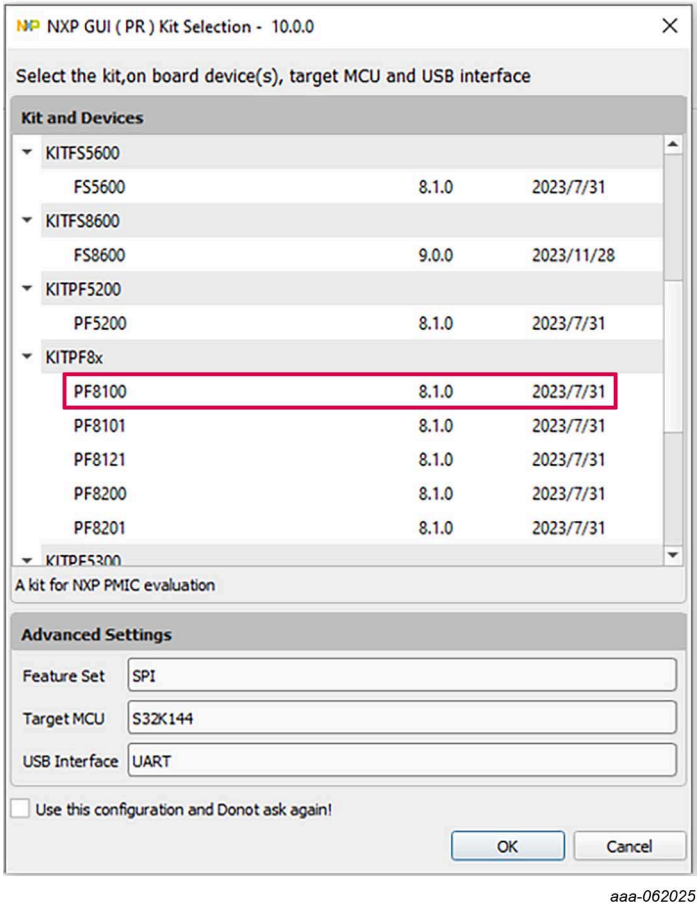

Figure 9. NXP GUI interface example

7.2.2 Generating the OTP file

If there is no existing version to support the project, use the GUI to set the OTP and generate the OTP programming files. For example, PF8200:

Follow the steps to generate the OTP file.

1. Switch to OTP Tab on the GUI to find there are different content pages about the OTP configuration
2. Finish all the configurations the project needs
3. Save the configuration and export the IHEX.txt
   Note: *The OTP programmer only takes the IHEX file.*

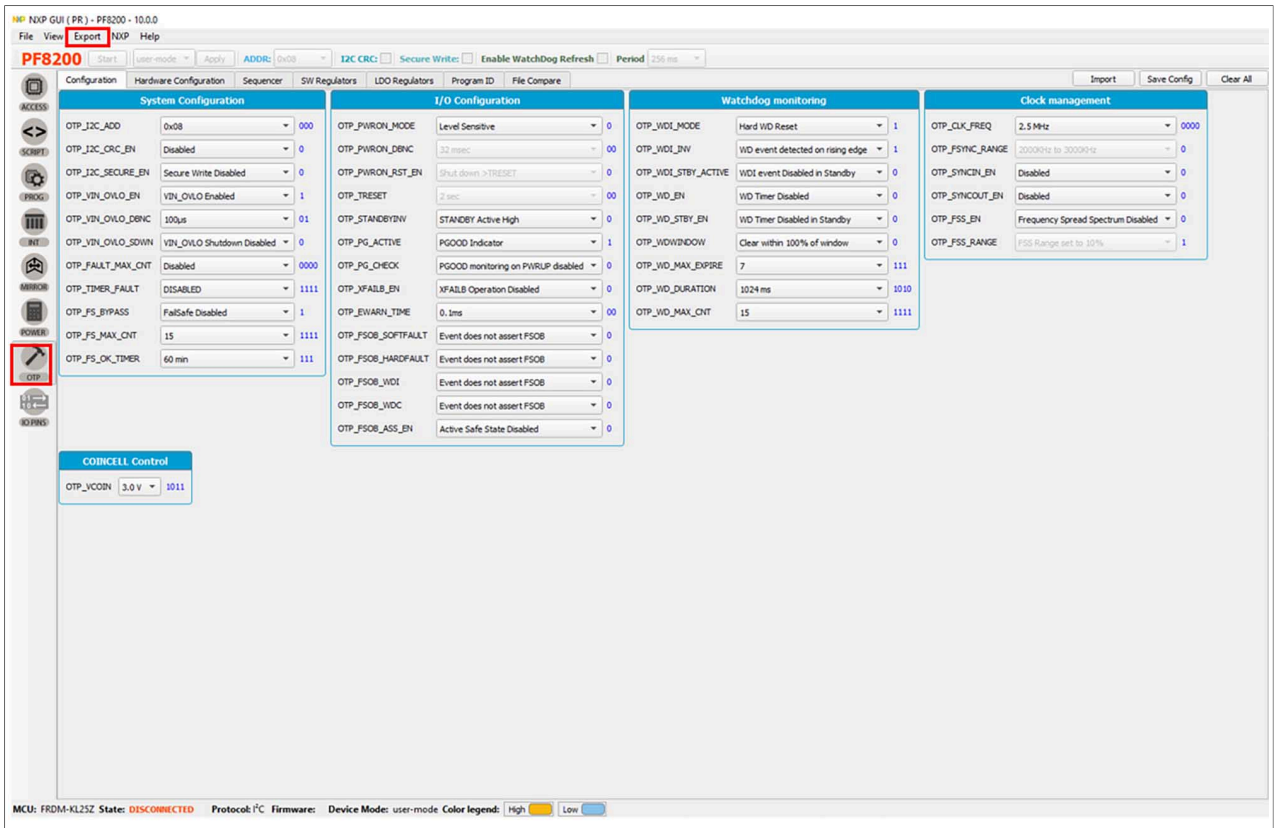

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Figure 10. OTP programmer

8 Programming the device with the IHEX file

The following is an example of how to get the OTP IHEX file for programming.

8.1 Programming IHEX file to the device

Follow the steps to program the device with the IHEX file:

1. Make sure the daughter board is connected with the mother board.
   Note: *The software itself is unable to identify if the correct daughter board is connected. Double-check before proceeding.*
2. Load the configuration in IHEX format.
3. Click the **Program** button to program the device with the IHEX configuration. The result is displayed as PASS or FAIL and the program shuts down its power supply for safe removal of the programmed IC. After programming the device, the software validates the device by resetting the power and checking the programmed bits.

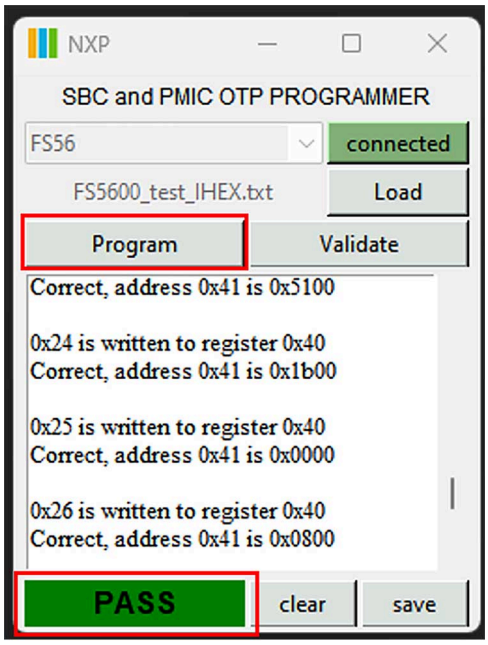

Figure 11. PASS programming example

Note: *User can only validate the device by clicking the* ***Validate*** *button to verify an unknown device program by comparing it with an IHEX file.*

4. After the programming is complete, click the **clear** button to clear the log window and the **save** button to log into a txt format for debugging.

The following are examples of FAIL programming results:

- If the device is already programmed, a warning pops up specifying the device is already programmed. The program shuts down and user can safely remove the part.

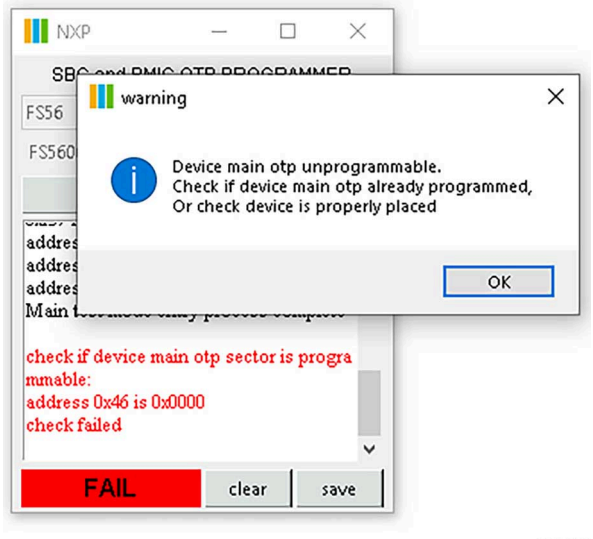

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Figure 12. Unprogrammable example

- If the device is faulty during the OTP programming procedure and defective, dispose the part. The program shuts down and user can safely remove the part.

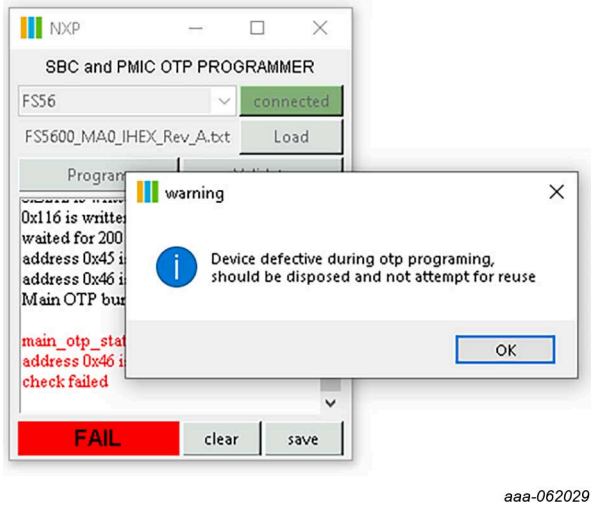

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Figure 13. Faulty programming example

- If during the programming validation phase, the device recorded an Error and programming failed. First, double-check if the part is placed properly in the socket and if it is, dispose the device.
  The program shuts down and user can safely remove the part.

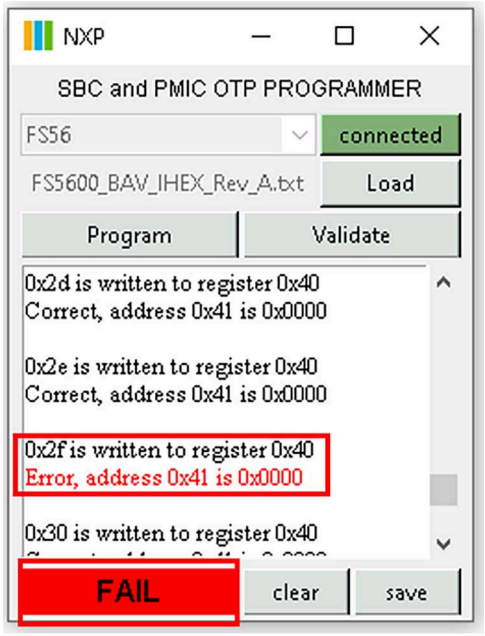

Figure 14. Error programming example

9 References

1. **PMIC-OTP-MB** – detailed information on this board, including documentation, downloads, and software and tools https://www.nxp.com/PMIC-OTP-MB

10 Revision history

Table 2. Revision history

Document ID	Release date	Description
UM12379 v.1.0	08 January 2026	Initial public version

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