

Programming a ZL3026x EEPROM

Introduction

This document describes three methods to program the EEPROM of the ZL3026x family of devices that contain an internal EEPROM (ZL30261, ZL30263, ZL30265, and ZL30267).

- Use of the ZLE30267 Evaluation Board and its associated evaluation software (hereafter referred to as “the GUI”) while connected to the external device to be programmed
- Direct Write mode
- EESEL Register Write Method

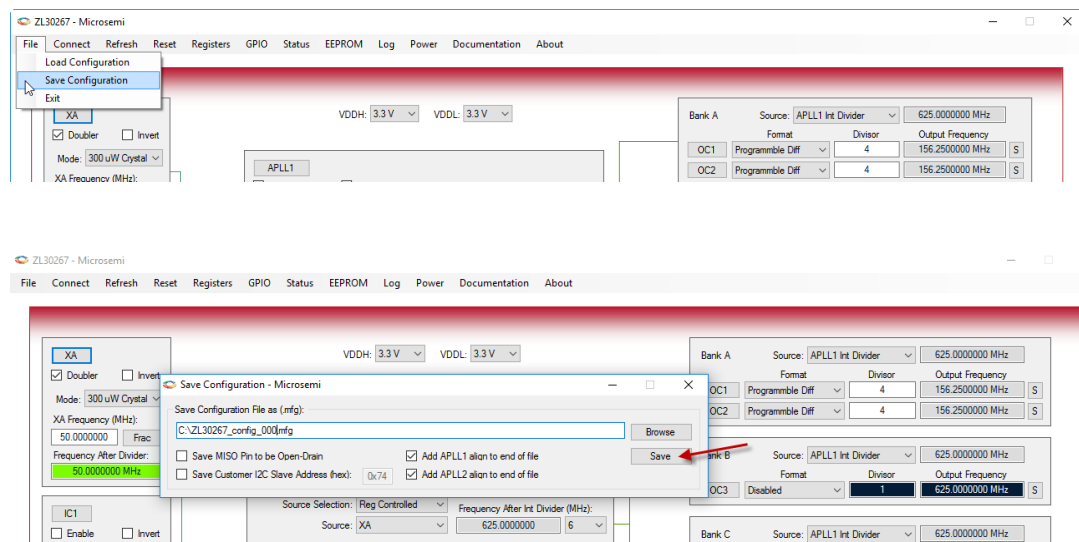
Note that while this document describes these methods using the GUI, user-generated software commands can also be used to program the EEPROM, as described in Microsemi App Note ZLAN-650: “Using the Aardvark I²C/SPI Host Adapter with the ZL3026x and ZL4025x.”

Creation of an EEPROM Image File

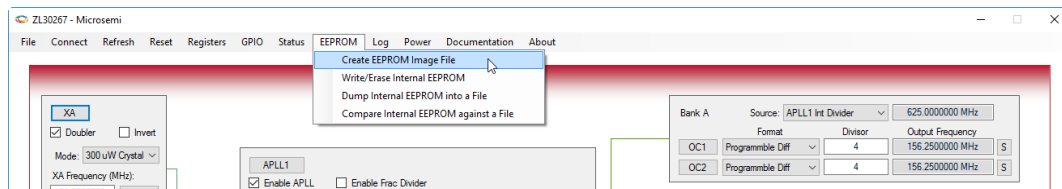
All three methods described in this document first require the creation of an “EEPROM Image File”, which is a representation of the ZL3026x configuration(s) to be stored in the EEPROM. The contents of a ZL30267 configuration file (a “.mfg file”) are not directly programmed into the device's EEPROM. The .mfg file(s) must first be converted into an EEPROM image file. In order to create this image file, the GUI must be used. The GUI can generate the EEPROM image file both while it is in “Working Offline” mode as well as when it is communicating with a ZLE30267 board; the resulting image file is identical in both cases.

The steps to create an EEPROM image file are as follows:

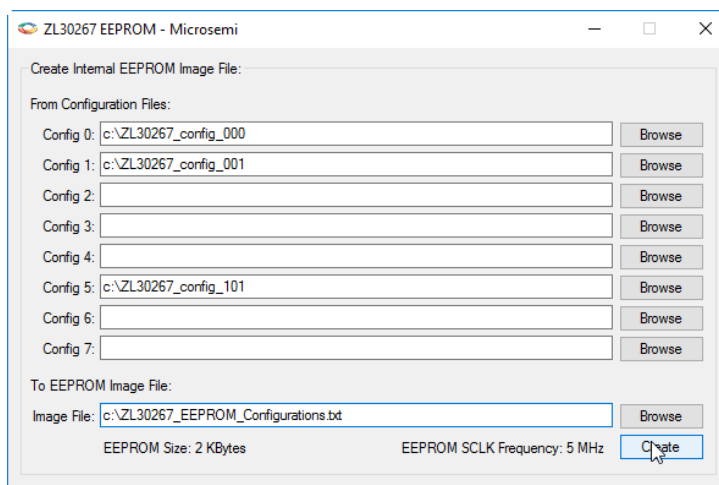
1. Save up to eight configuration files. The images below show the procedure to save a configuration file named “ZL30267_config_000.mfg”



- After the desired configuration files have been saved, select “Create EEPROM Image File”



- Enter the configuration file names into the window that pops up, choose a name for the EEPROM image file, and then click “Create”.

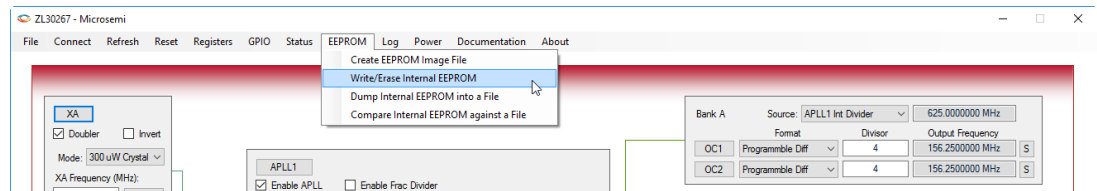


- Config 0 corresponds to the configuration that will load after the EEPROM Image has been loaded into the ZL3026x EEPROM and RSTN is de-asserted while pins AC[2:0] = 000. Similarly, the other configurations correspond to the AC[2:0] binary representation of the decimal configuration number.
- Note that the GUI-generated device configuration (.mfg) file should never be modified to add a write to the EESEL register (described below). The device configuration file should only contain the device configuration. The GUI-generated EEPROM image file created from the device configuration file should never be manually edited without factory supervision.

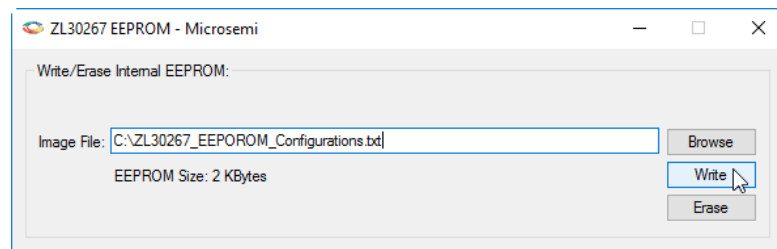
Use of the ZLE30267 Evaluation Board and GUI while Connected to the External Device to be Programmed

The most straightforward approach to program the ZL3026x EEPROM is to use the GUI while the ZLE30267 is controlling the ZL3026x device that is to be programmed. See Microsemi Application Note ZLAN-658 “Controlling An External Device Over SPI or I²C using a ZLE30267 Board” for more detail on controlling an external device using the GUI. Note that the GUI steps to programming the internal EEPROM are identical, irrespective of whether the GUI is communicating with the external ZL3026x via SPI or I²C. The steps to program the ZL3026x EEPROM using the GUI are as follows:

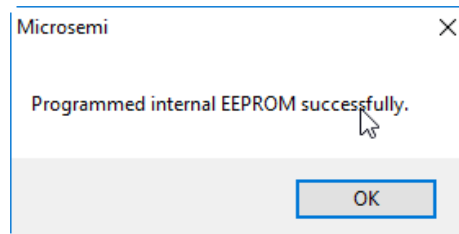
1. After establishing the GUI connection to the ZL3026x to be programmed, select “Write/Erase Internal EEPROM”



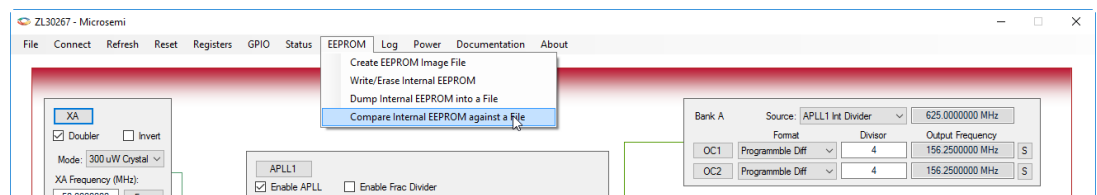
2. Enter the image file location and click “Write”



3. The following pop-up window appears:



4. If the user would like to verify that the contents of an internal EEPROM that has already been programmed match the contents of an EEPROM image file, select “Compare Internal EEPROM against a file” and follow the prompts.



Direct Write Mode

Direct EEPROM Write Mode is a **hardware-only method** for gaining access to the device's internal EEPROM. The user does not need to access the ZL3026x's registers; all that is required is that the pins listed below are set to the states shown while the RSTN pin is de-asserted.

- TEST = 1
- AC[2:0] = 000
- IF[1:0] = 11

Setting the device in Direct Write Mode configures the ZL3026x so that standard industry SPI EEPROM programmers can program the internal EEPROM. In other words, putting the ZL3026x into Direct Write mode makes the ZL3026x look simply like it is an industry-standard SPI EEPROM on the bus.

- The ZL3026x device registers (as described in the ZL3026x data sheets) are not available in Direct Write Mode. In order to access the ZL3026x device registers, TEST must = 0 when the RSTN pin is de-asserted (which takes the ZL3026x out of Direct Write mode).
- Direct EEPROM write mode supports SPI mode EEPROM access only, not I²C.
- When Direct EEPROM Write Mode is used to access the device EEPROM, a register write to the EESEL bit in register 00h (as described below) is not needed. It is also not possible because the device registers are not accessible.
- Once the Direct EEPROM Write Mode has been set to gain access to the ZL3026x's EEPROM, the entire contents of the EEPROM image file should be programmed into the EEPROM.
- When the default output format file (ASCII hex) is used, the EEPROM image file contains the bytes of data to be written to the EEPROM listed one byte per line starting at EEPROM address 0x000.
- Note that the EEPROM page size is 32 bytes and page boundaries fall on mod-32 addresses. For example, address range 0x020 - 0x03F is the second 32-byte page in the EEPROM.
- Burst data writes of 1 byte up to a full page (32 bytes) can be performed. A burst data write can start on any address in a page. A burst data write should not cross a page boundary. A minimum delay of 5ms is required between each EEPROM data write.

EESEL Register Write Method

Mapping device SPI / I²C writes and reads to the EEPROM space is enabled by setting the EESEL bit in the EESEL register to a "1". In other words, a write to register 00h with a value of 0x80 directs all following device writes and reads to be mapped to the EEPROM space.

- Writing 0x80 to register 00h (i.e., setting the EESEL bit = 1) accomplishes the same functionality as the hardware-only Direct Write Mode described above.
- This method gives more flexibility than the Direct Write Mode, but it requires the user to write the ZL3026x device register space in order to program the EEPROM memory.
- The EESEL register method allows the user to switch between device register access mode and EEPROM access mode by simply changing the EESEL register value.
- The EESEL register method supports both SPI and I²C mode to access the EEPROM.

Summary of Differences between Direct Write Mode and Register Writes Mapped to the EEPROM Space

Direct EEPROM Write Mode is a hardware-only method for gaining access to the device's internal EEPROM. It accomplishes the same functionality as writing a value of 0x80 to register EESEL when the device is operating in one of the normal (TEST=0) device modes. A few differentiating factors of the two approaches are:

- Direct EEPROM Write Mode may provide a simpler method for placing the device into EEPROM programming mode in a production environment. Direct EEPROM write mode method only requires controlling the state of a few device pins on reset de-assertion. The EESEL register write method requires performing a write to register EESEL.
- The EESEL register method allows you to switch between device register access mode and EEPROM access mode by simply changing the EESEL register value. Device registers are not accessible in direct EEPROM write mode. Additionally, the TEST, AC, IF pins states must be changed to a non-test mode (TEST=0) and then a hardware reset performed to access to the device registers.
- The EESEL register method supports both SPI and I2C mode EEPROM access. Direct EEPROM write mode only support SPI mode access.



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