



UM11154

NTAG SmartSensor getting started: Reprogramming an NHS31xx using Flash Magic

Rev. 2.02 — 14 August 2020

User manual

Document information

Information	Content
Keywords	NTAG SmartSensor, NHS3100, NHS3152, LPC-Link2, program
Abstract	Companion document to the NXP NTAG SmartSensor webpages. Explains how to get started using Flash Magic.



**NTAG SmartSensor getting started:
Reprogramming an NHS31xx using Flash Magic****Revision history**

Rev	Date	Description
v.2	2020-08-14	second revision
Modifications:		<ul style="list-style-type: none">• Adding links to images for NHS3100SENSORDB• Adding links to iOS apps• Adding links to images for the Signed URL demo
v.1	2018-09-20	first revision

1 Introduction

The firmware residing on the FLASH memory in an NHS31xx chip can be replaced using a wired connection. Any firmware can be written using a wired connection, including the *One-time NFC program downloader* and the demo firmware images included in the SDK.

With the proper setup, a program running on your PC can take control of the flash controller via the debug interface of the chip, erase the FLASH memory, and reprogram it with your new firmware. There are different options, but the focus in this document is on the GUI of Flash Magic only.

This document provides links to various firmware images, ready to be used by the GUI of Flash Magic. Together with your NTAG SmartSensor board and this document, you can repurpose a board and start a different demo in minutes.

Note: *The firmware currently residing in flash can disable access to the flash controller via the debug interface. This is recommended behavior for production images. More information can be found with the firmware documentation.*

Note: *More information for each specific board referenced in this document can be found on [nxp.com](https://www.nxp.com).*

- <https://www.nxp.com/pages/:NHS3100>
- <https://www.nxp.com/pages/:NHS3100UCODEADK>
- <https://www.nxp.com/pages/:NHS3100SENSORADK>
- <https://www.nxp.com/pages/:NHS3100THADADK>
- <https://www.nxp.com/pages/:NHS3152THADADK>
- <https://www.nxp.com/pages/:NHS3152>

2 Flash Magic

Other tools exist, besides Flash Magic, that allow a wired programming approach. During development, the LPCXpresso IDE is continually used. During production, gang programming services are available for HVQFN24 and WLCSP25 packages.

Flash Magic can also be used for gang programming, using its command-line interface. This document focuses on the GUI interface of Flash Magic only.

Note: Only versions from v9.72 onwards have support for the NHS31xx ICs. Until Flash Magic is updated on other platforms, only the Windows platform is supported. The screenshots below are taken from Flash Magic v11.16.

2.1 Installation

Download Flash Magic from <http://www.flashmagictool.com>. Install and follow the prompts on the screen.

Note: Also allow the installation of the LPC USB drivers of NXP Semiconductors.

2.2 Usage

When using Flash Magic, the images used for wired programming must all be in the Intel Hex (.hex) format.

2.2.1 Physical setup

Before launching Flash Magic, be sure that the HW is correctly connected:

1. No jumper may be placed over JP1.
2. A jumper must be placed over JP2.
3. Connect the LPC-Link2 board with your PC using a mini-USB cable.
4. Connect the demo PCB with the LPC-Link2 board using a JTAG cable.

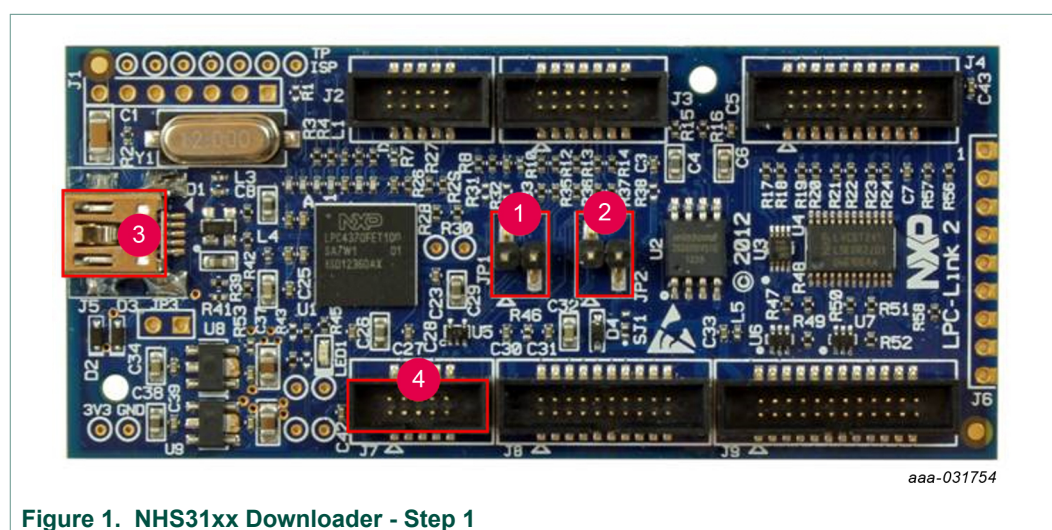


Figure 1. NHS31xx Downloader - Step 1

Warning: Flash Magic cannot program via the LPC-Link2 debugger board if:

- The LPC-Link2 board is not connected when Flash Magic is started.
- The LPC-Link2 board is running a CMSIS-DAP debugger firmware other than the customized version used by Flash Magic.

If Flash Magic cannot find your LPC-Link2 board, check your setup, power cycle the board, and restart Flash Magic.

2.2.2 GUI settings

Settings are remembered between sessions. Nonetheless, it is advised to check each setting each time before attempting to flash.

1. Select the NHS31xx IC you want to program.
2. Select the `SWD over Link2` Interface.
Other settings in the communications step are ignored.
3. Safest is to erase all Flash sectors.
4. Make sure that you select the correct firmware image, in Intel HEX format. Images can be obtained via:
 - The download links to the different demo applications provided in the next chapter.
 - The SDK, in the `Debug` and `Release` subfolders of each provided demo and example application.
 - The LPCXpresso IDE, where you compile your own application.
5. With the `Execute` checkbox ticked, the IC will reset and start executing the new firmware immediately after programming has finished.
6. When all settings are correct, click `Start` to carry out the requested operations.

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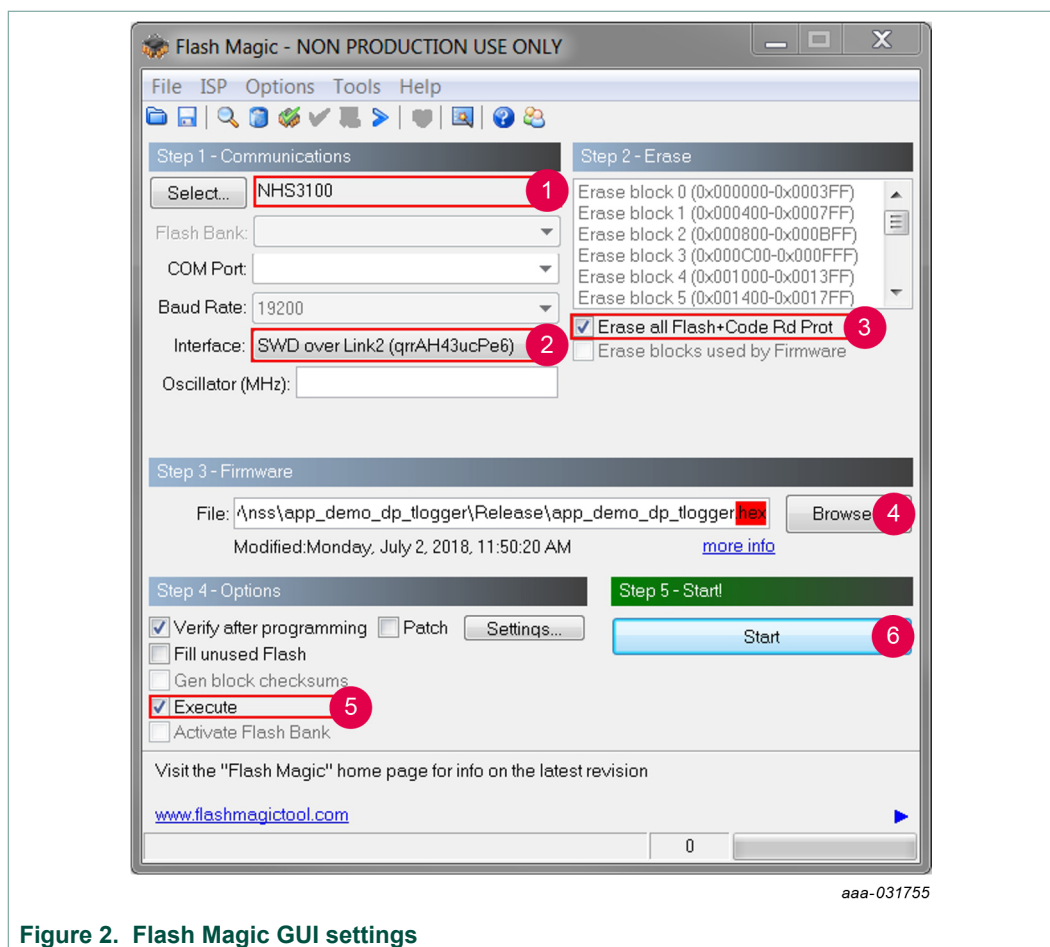


Figure 2. Flash Magic GUI settings

3 Boards

The images suitable for wired download, using the external Windows tool [Flash Magic](#), are all in Intel Hex (.hex) format. Use the download links below to store them locally on your PC.

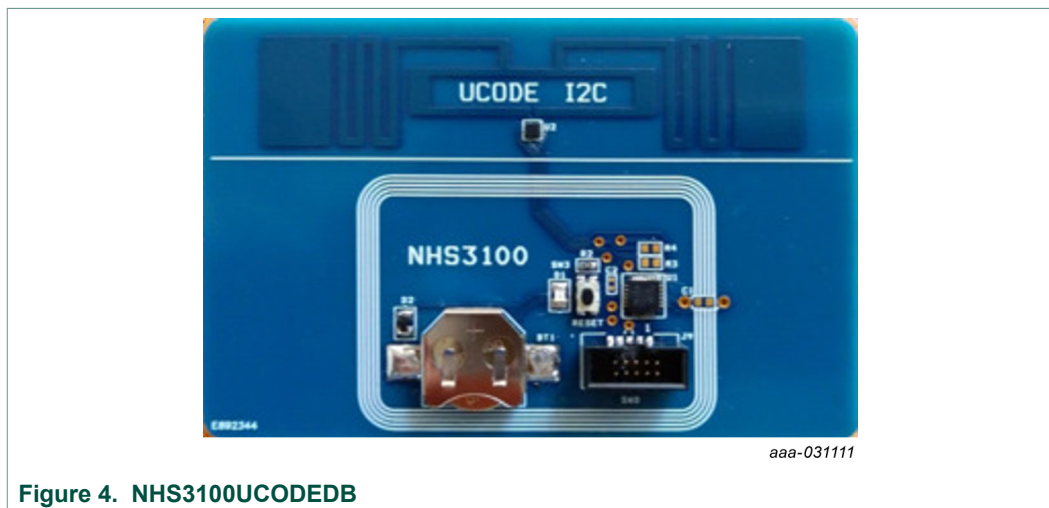
3.1 NHS3100 temperature monitor board



Figure 3. NHS3100TEMODB

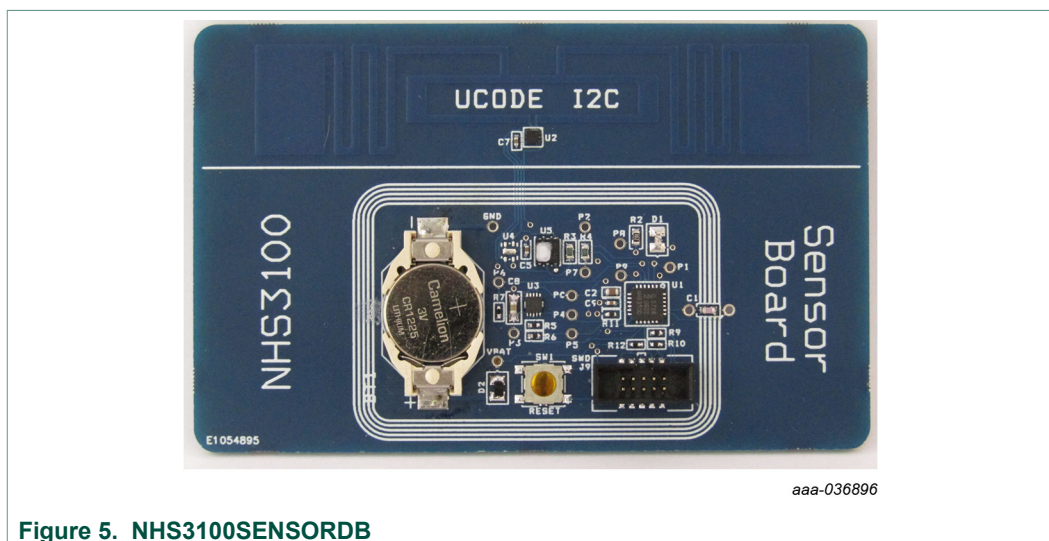
- **Temperature Logger demo.** Active demo (requires a battery). To be used with the *NHS3100 Temperature Logger app*, available in the [Google Play Store](#) and the [Apple APP store](#).
Firmware: [tlogger.hex](#)
- **Signed URL demo.** Passive demo (requires removing the battery after flashing). To be used with the *NHS31xx Signed URL app*, available in the [Google Play Store](#) and the [Apple APP store](#).
Firmware: [signedurl.hex](#)
- **Blinky.** A basic *Hello World* image, which continually toggles an LED and nothing else.
Firmware: [blinky.hex](#) (LED on PIO7)

3.2 NHS3100 - UCODE-I2C solution board



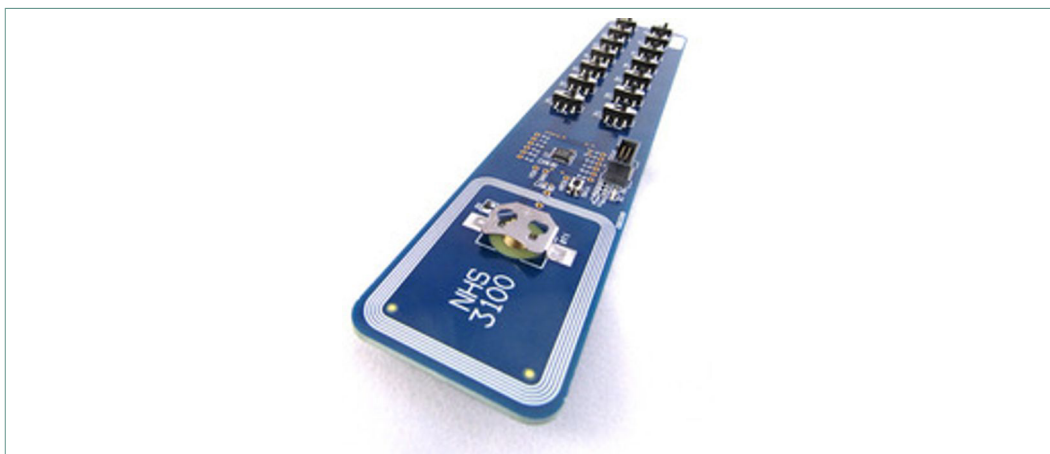
- **Temperature Logger demo with logistics status reporting.** To be used with the *NHS3100 Temperature Logger app*, available in the [Google Play Store](#) and the [Apple APP store](#); and the *NHS3100 UCode-I2C combo* application for Windows and macOS, available in the SDK under `sw/crossplatform/tloggerucode`.
Firmware: [tloggerucode.hex](#)
- **Blinky.** A basic *Hello World* image, which continually toggles an LED and nothing else.
Firmware: [blinky.hex](#) (LED on PIO8)

3.3 NHS3100 sensor board



- **Sensor monitor demo combining temperature, shocks, tilting, and humidity with logistics status reporting.** To be used with the *NHS3100 Sensor Board Monitor app*, available in the [Google Play Store](#) and the [Apple APP store](#); and the *NHS3100UCode-I2C combo* application for Windows and macOS, available in the SDK under `sw/crossplatform/tloggerucode`.
Firmware: [sensorboard.hex](#)
- **Sensor monitor demo combining temperature and vibrations for preventive maintenance scheduling in an Industry 4.0 environment.** To be used with the *NHS3100 Sensor Button Monitor app*, available in the [Google Play Store](#) and the [Apple APP store](#).
Firmware: [sensorbutton.hex](#)

3.4 NHS3100 therapy adherence board

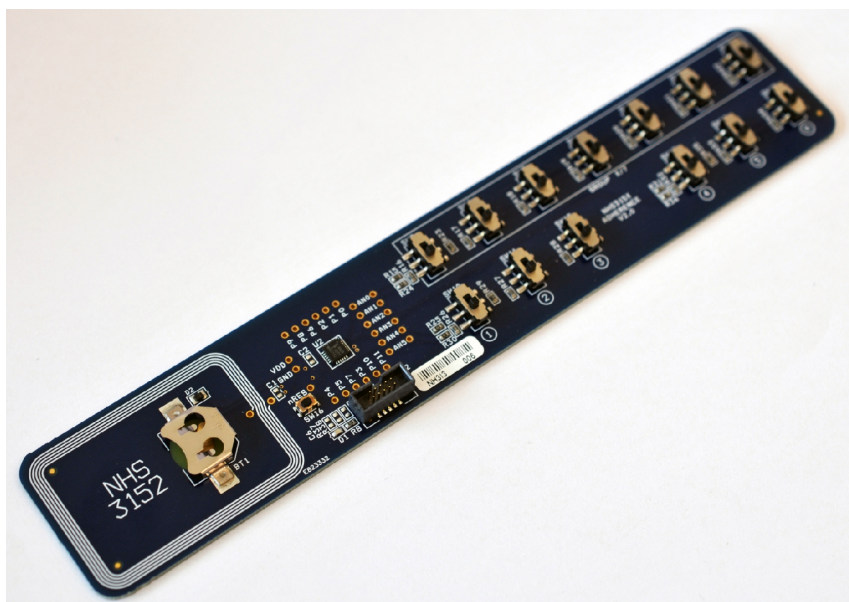


aaa-031112

Figure 6. NHS3100THADDB

- **Therapy Adherence demo** (using 14 switches and 8 digital pins). To be used with the *NXP Therapy Config*, available in the [Google Play Store](#).
Firmware: [tadherence.hex](#) (using PIOs)
- **Blinky**. A basic *Hello World* image, which continually toggles an LED and nothing else.
Firmware: [blinky.hex](#) (LED on PIO7)

3.5 NHS3152 therapy adherence board

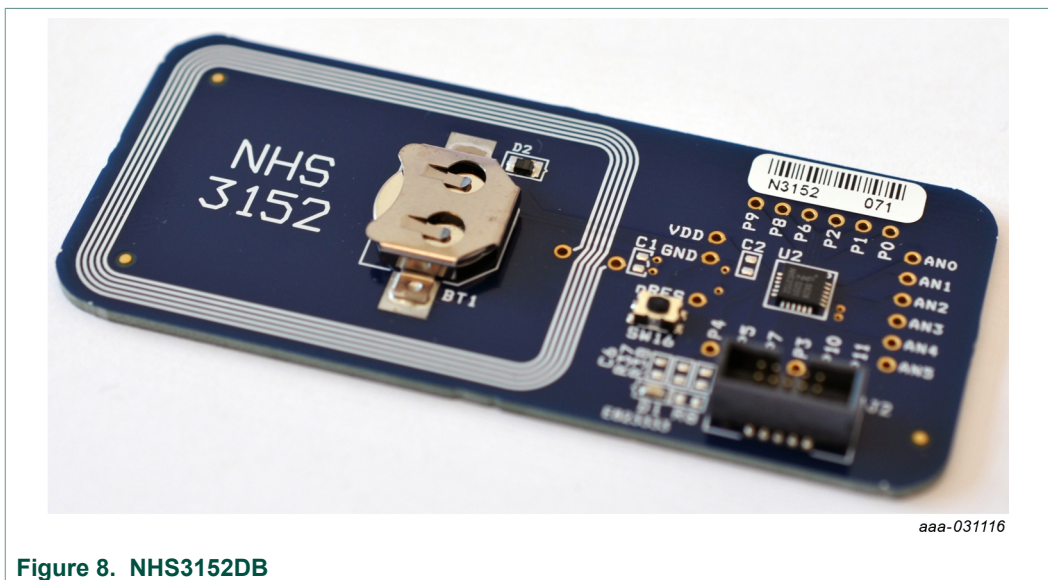


aaa-031114

Figure 7. NHS3152THADDB

- **Therapy adherence demo** (using 13 switches and 6 analog pins). To be used with the *NXP Therapy Config*, available in the [Google Play Store](#).
Firmware: [tadherence.hex](#) (using ANAs)
- **Blinky**. A basic *Hello World* image, which continually toggles an LED and nothing else.
Firmware: [blinky.hex](#) (LED on PIO7)

3.6 NHS3152 board



No demo application has been created that specifically targets this board. It is intended purely as a development board, providing easy access to all pins. Use this board to integrate the NHS3152 IC with custom external components and sensors.

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