Programming Guide

Sentrius™ MG100 Gateway Series

Version 2.0

Revision History

Version	Date	Notes	Contributor(s)	Approver
1.0	23 Aug 2020	Initial Release	Robert Gosewehr	Jonathan Kaye
2.0	11 Mar 2025	Ezurio rebranding	Sue White	Dave Drogowski

Contents

1   Introduction

The purpose of this guide is to illustrate how to connect the MG100 Gateway to a development PC with a J-Link debugger and cable adapted. Once connected, this guide covers the process of how to download and flash firmware to the MG100.

2   Hardware Setup

2.1   Programming Hardware

2.1.1   J-Link Programmer

The MG100 is compatible with the Segger J-Link debugger: https://www.segger.com/products/debug-probes/j-link/models/model-overview/. The J-Link Base or J-Link Base Compact is recommended however there are other options available that will work with the MG100 depending on User needs.

Figure 1: Segger J-Link Base Debugger

2.1.2   Programming Adapters

J5 (Figure 6) on the PCBA is compatible with Tag-Connect TC2030-IDC or TC2030-CTX ARM ® Cortex™-M4 CPU line of plug-of-nail cables and requires this ARM20-CTX Adapter or J-Link 9-Pin Cortex-M Adapter.
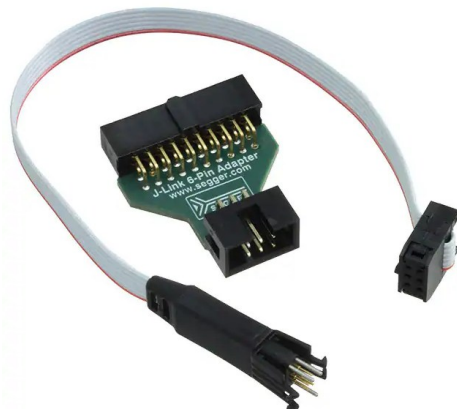

Figure 2: Tag-Connect TC2030-IDC with ARM20-CTX Six-Pin Adapter

2.2   MG100 Gateway

Remove the four (4) screws from the back of the gateway using a Philips screwdriver. Remove the top enclosure lid once screws are removed.

Figure 3: Micro-Gateway Back Enclosure – Any Antenna Variant

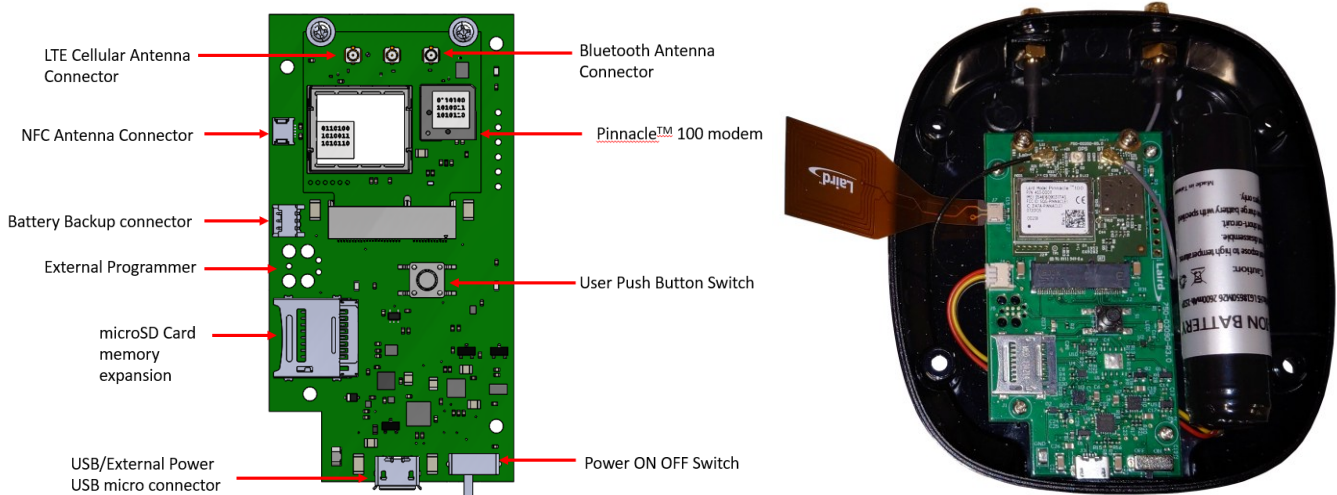### 2.2.1   Sentrius™ MG100 – Product Variants

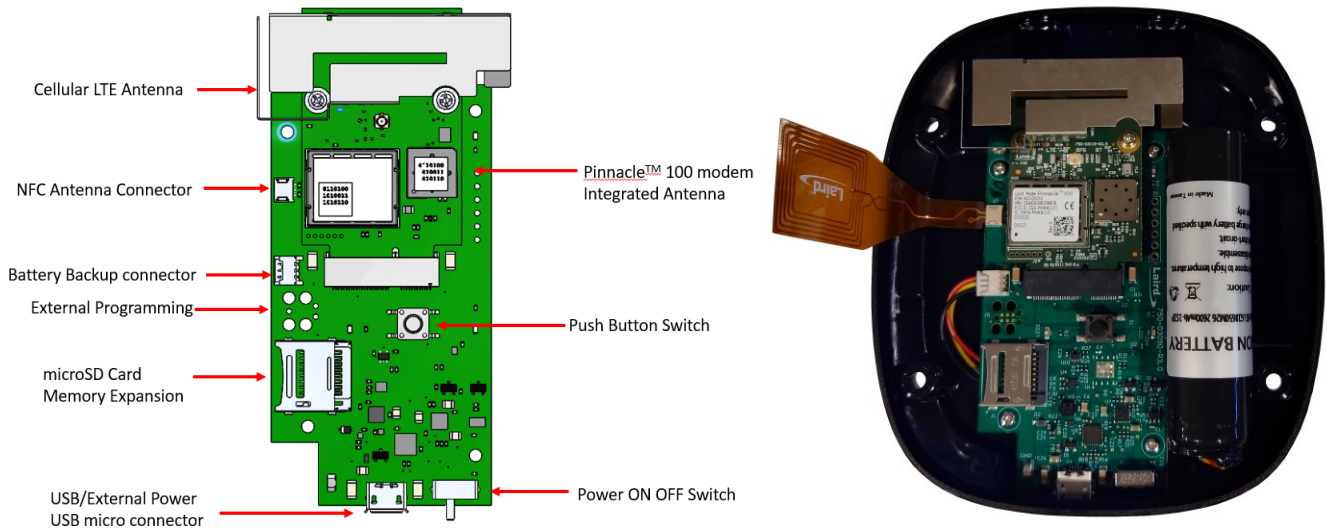*Figure 4: Micro-Gateway PCBA with Pinnacle™ 100 modem – External Antenna Variant*

Figure 5: Micro-Gateway PCBA with Pinnacle™ 100 modem – Integrated Antenna

2.3 SWD Programming Interface

Connect the supported Tag-Connect adapter (Figure 2) and Segger debugger (Figure 1) to J5 on the PCBA. Connect the Segger debugger to a PC using a USB-A to USB-B cable.
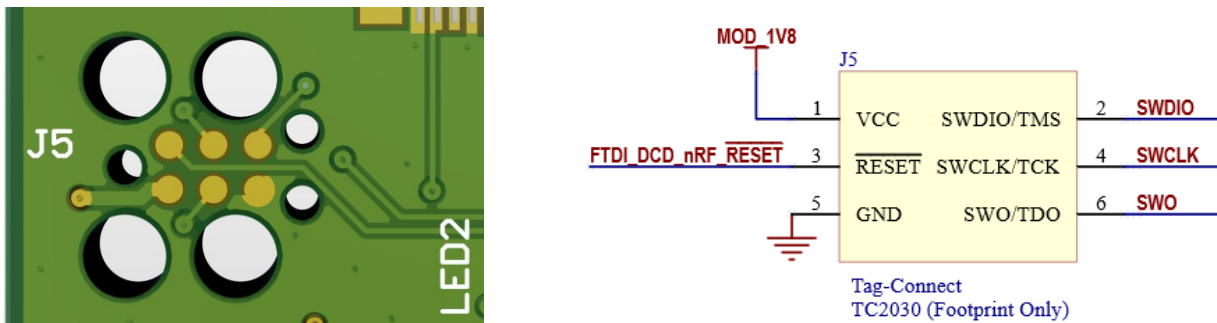

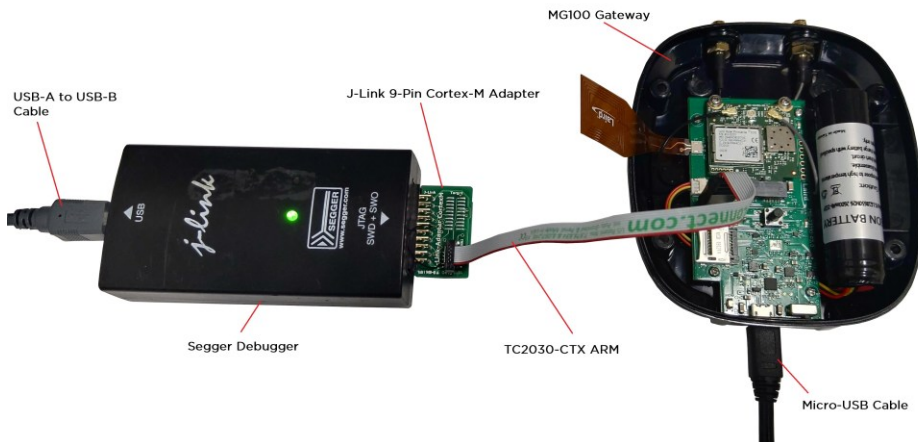*Figure 6: J5 Single Wire Programming Connector*

Figure 7: Micro-Gateway Connection to Debugger

2.4 Powering the Gateway

Power the gateway by connecting the micro-USB cable into the micro-USB slot (J3) of the gateway. Connect the USB-A connector side of the cable into a PC or wall mount power adapter with USB-A support. Switch the Power On/Off switch to the On position. If using a battery back-up version of the gateway, a micro-USB cable is not necessary as long as the battery has charge.

Figure 8: Power Input and Power Switch

3 Software Setup

3.1 nRF Connect Software

Download and install the nRF Connect software tool from the Nordic website: https://www.nordicsemi.com/Software-and-tools/Development-Tools/nRF-Connect-for-desktop/Download.

Once the nRF Connect software has installed, a secondary prompt screen will appear with App options. Install and Update the Programmer app. Open the Programmer app once installed and updated.
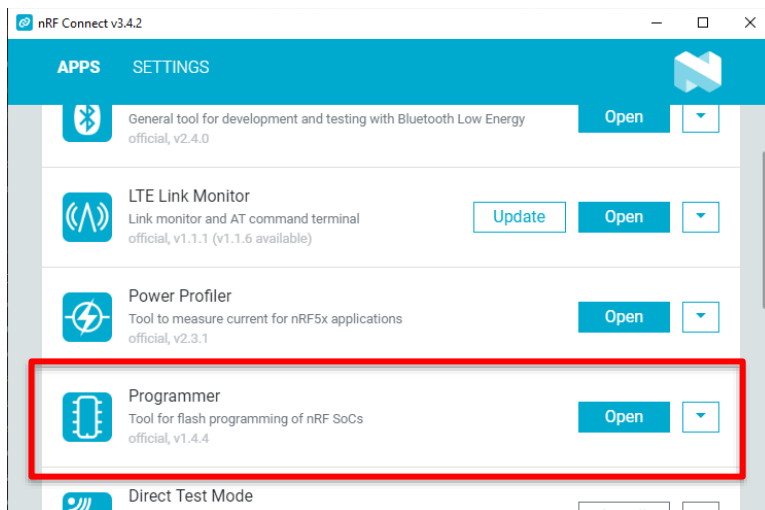

Figure 9: Programmer nRF App Option

4 Programming MG100

Once the Programmer App has started, in the upper left corner, press on the **Select device** drop down list and select the device with the leading zeros:
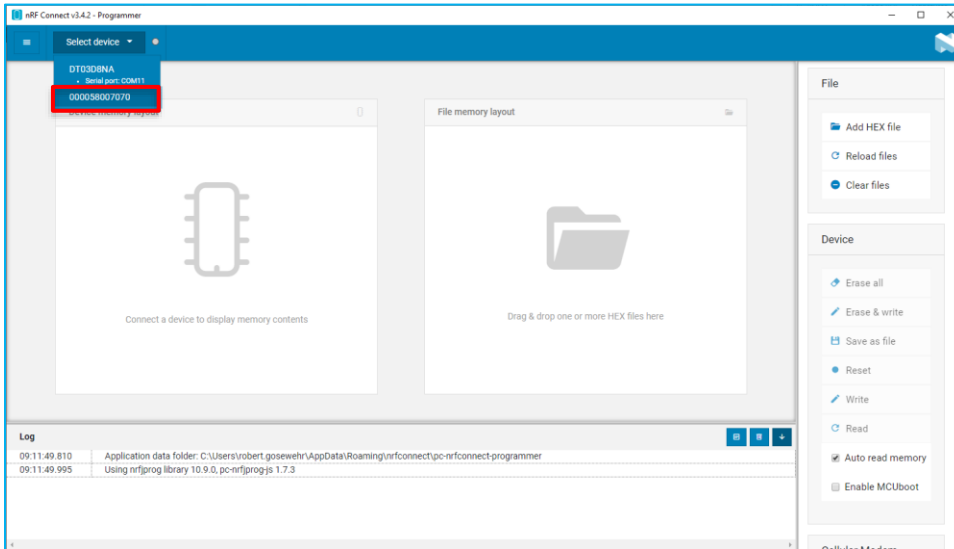

Figure 10: Hardware Selection

After the device selection the software will read the memory layout from the Nordic nRF52840 chipset from the Pinnacle™ 100 modem installed in the micro-gateway and display it on the left side.
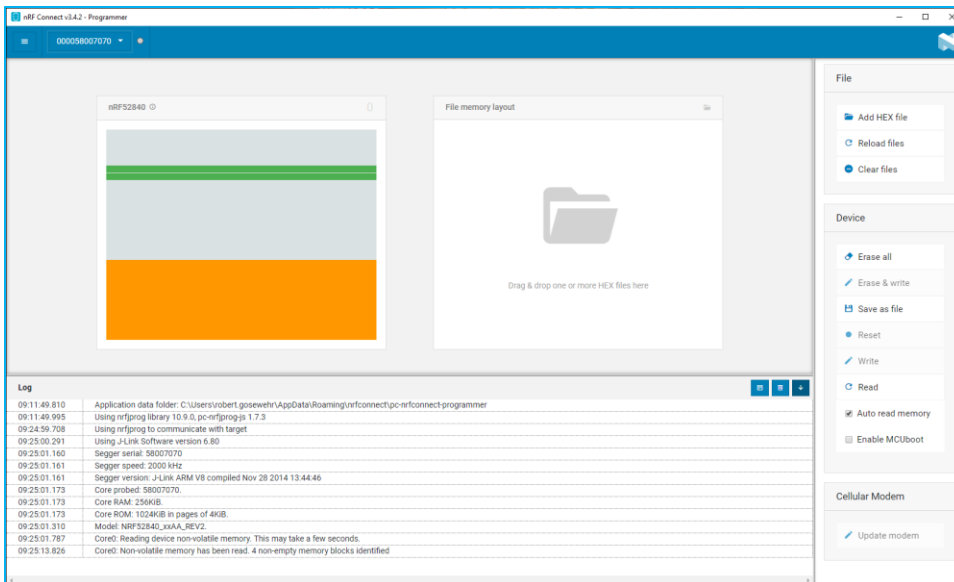

Figure 11: Memory Allocation of Nordic Chipset

4.1   MG100 Firmware Download

The Out of Box Demo (**OOB**) firmware, part number 480-00070, and the bootloader, part number 480-00053, for the micro-gateway can be found on our GitHub site: MG100 Firmware.

Note: The MG100 gateways have the bootloader and OOB firmware installed during production. However, if for some reason the bootloader and or the OOB firmware need to be updated, the process is explained in this guide.

For users with custom firmware, this guide goes through the firmware update process using the OOB firmware as an example firmware to explain the process. Custom firmware development can utilize the same process explained in this guide to update the MG100 gateways.

Download the OOB and bootloader firmwares and place in an easy to find file location. The firmware will save to the default location (Downloads folder on Windows) when downloaded from the GitHub site.

4.2   Loading Firmware

Load the two firmwares (OOB & Bootloader) into the Programmer App software by clicking on the **Add Hex File** button on the right column menu under the *File* header. Browse for the file location of the two firmware files and select the necessary firmware. Only one firmware file can be selected at a time so will need to repeat this step to load the other firmware. The order of selecting the files does not matter.

Note: The software will remember the file location path of a previously selected hex file. This option will appear when selecting the **Add Hex File** button.
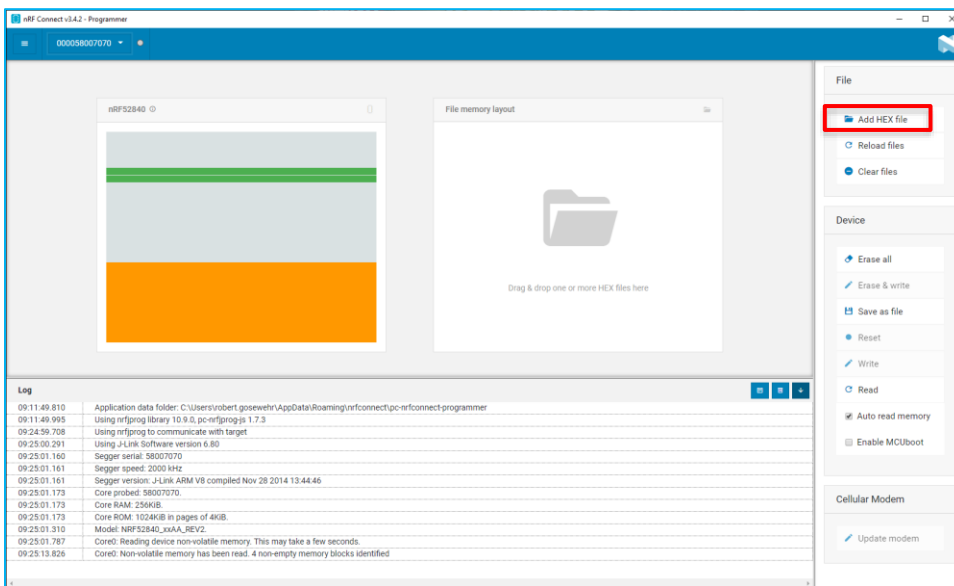

Figure 12: Adding Hex Files

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4.3   Programming Gateway

Once the two firmwares have been added, the file memory layout on the screen will update. From here, click on **Erase & Write** action under the **Device** header to start the firmware update.
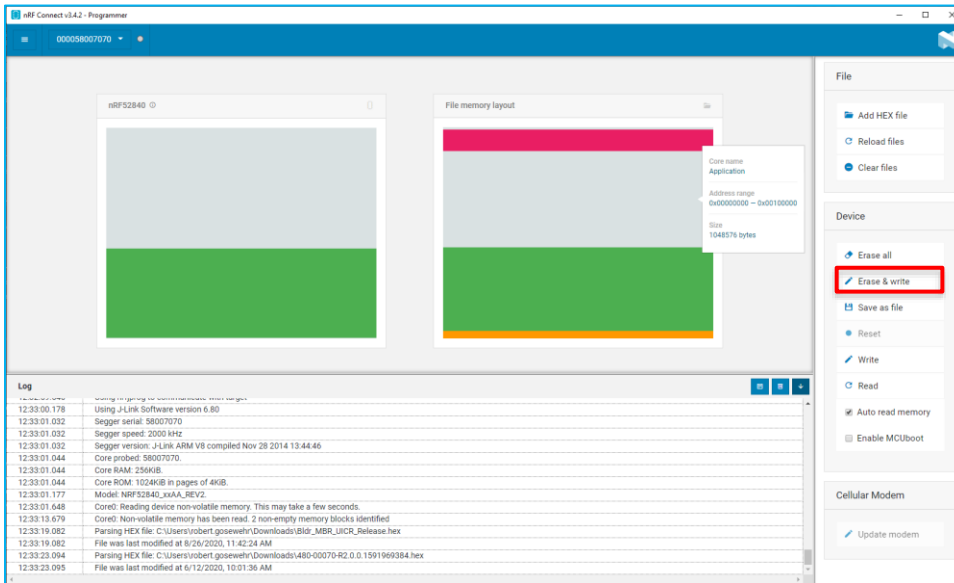

Figure 13: Updating the Firmware to the Micro-Gateway

Once the update has completed, the memory allocation for the Nordic chipset will also update. The firmware update is completed at this point, and the gateway is ready to run the Out of Box Demo. Reference the Out of Box Demo documentation found on our GitHub site to see how the demo operates (Link provided in section 4.1)
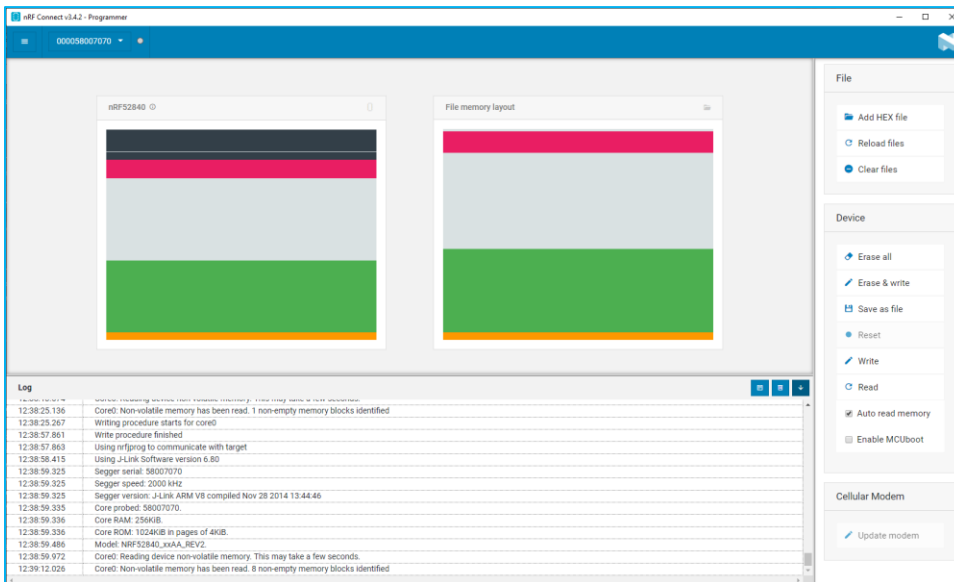

Figure 14: Firmware Update Complete

5 Additional Documentation

Ezurio offers a variety of documentation and ancillary information to support our customers. Additional documentation can be accessed from the Documentation tab of the Ezurio Sentrius MG100 Gateway Product Page.

For any additional questions or queries, or to receive technical support for this Development Kit or for the Sentrius MG100 Gateway or Pinnacle™ 100 modem, please contact Ezurio Support: https://www.ezurio.com/resources/support

6   Additional Information

Please contact your local sales representative or our support team for further assistance:

Headquarters	Ezurio 50 S. Main St. Suite 1100 Akron, OH 44308 USA
Website	http://www.ezurio.com
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