AN-013 Golf Data Analysis – OPS243-A

From time to time, OmniPreSense provides code updates with new features and/or fixes for its radar sensors. The embedded code in the OPS241/OPS242/OPS243 short range radar sensor can be easily updated to take advantage of these enhancements. This application note describes how to update the code on the OPS241/OPS242/OPS243 radar sensors.

Update Tools

To update the code on the OPS241/OPS242/OPS243 radar sensor the user will need a JTAG programmer and a PC based code flashing tool. An example of a low cost JTAG programmer is shown Figure 1. This programmer is relatively inexpensive and available from Adafruit here or other distributors. Other models are available from Segger.

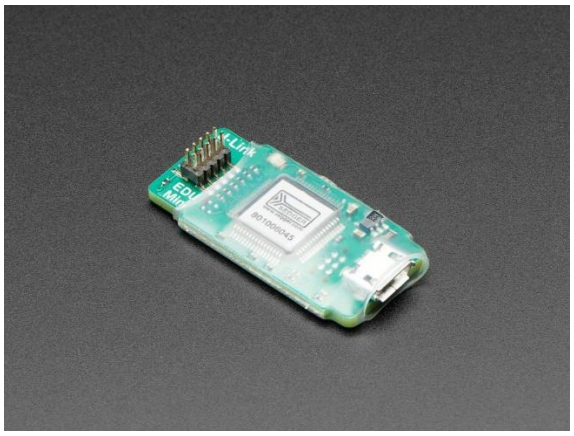

Figure 1. JTAG Programmer

The code flashing tool used by OmniPreSense is XMCFlasher™ provided by Infineon. This free tool is available here. Scroll down the page to find the Programmers/Flash Tools section (Figure 2) and click on "+" to expand the menu. Scroll down to the Infineon section and download XMCFlasher.

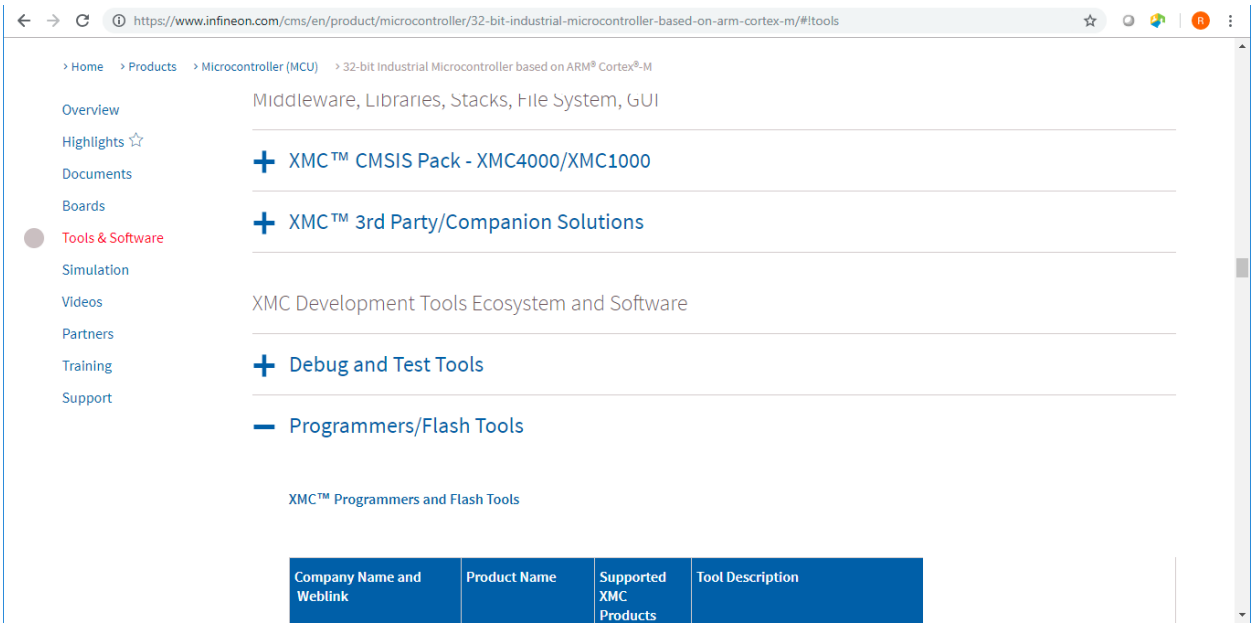

Figure 2. XMCFlasher Download Page

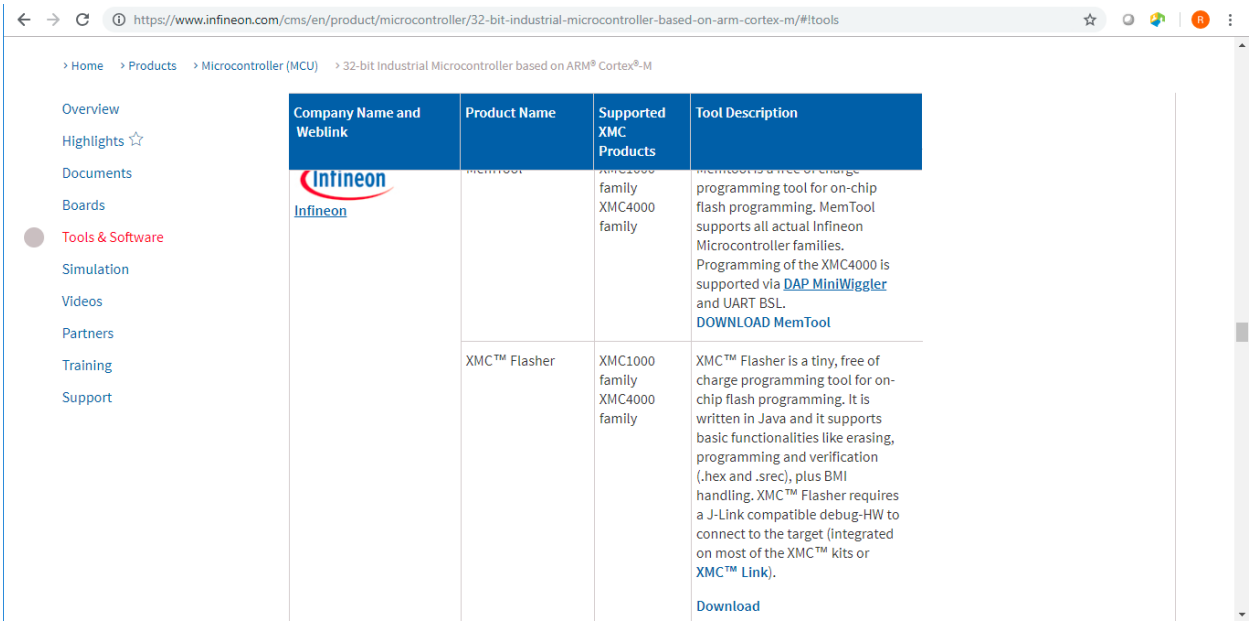

Figure 3. XMCFlasher Download

Updating Code

To update the code in the OPS241/OPS242/OPS243, follow the step-by-step instructions below. You will need to have a JTAG programming tool like the Segger noted above. You may also need to install the J-Link Software and Documentation Pack which can be found here.

Step 1. Download and install the XMCFlasher programming tool from the Infineon website. Follow the installation instructions that come with the download.

Step 2. Connect the JTAG programmer's connector to the JTAG connector on the OPS241/OPS242 (J6) located near the middle of the board (Figure *4*). On the OPS243 the JTAG connector is J2 and located to the right side of the board with the antennas positioned at the top or lower left on the version D2 and later boards. The connector is keyed, so it can only connect in one direction.

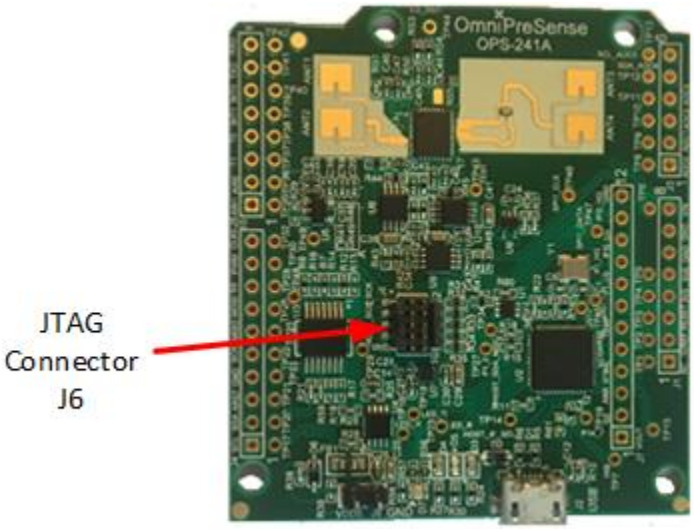

Figure 4. JTAG Connector (J6 on OPS241)

Step 3. Plug in the USB connector of the JTAG programmer into a USB port on the PC. If the ribbon cable that came with the Segger programmer was not plugged in, connect it. The connector on the programmer is not keyed. On some Seggers, the connector on the cable should be mounted so that the cable goes away from the programmer board as show in (Figure 5). On other boards, the cable may need to point in the other direction. When the sensor is connected to the XMCFlasher tool, if the Unique Chip ID does not populate (Step 7), rotate the connector on the Segger by 180° and hit the Connect button again. Plug in a USB micro cable into the OPS241/OPS242/OPS243 and the other end into another USB port on the PC. This provides power to the OPS241/OPS242/OPS243 during the program update.

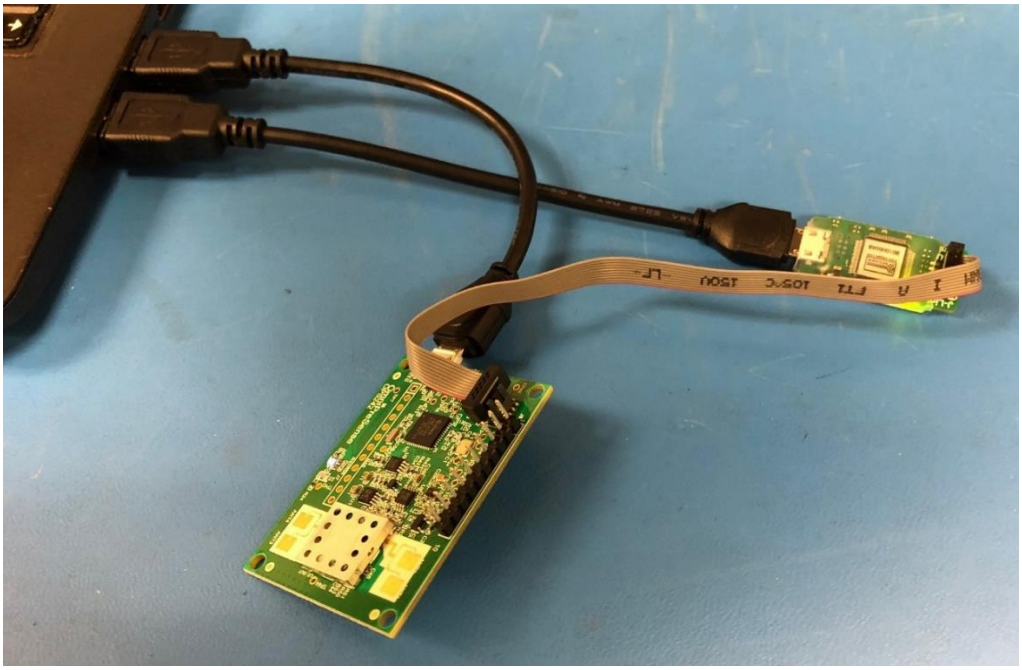

Figure 5. USB and JTAG Connections to PC

Step 4. Start XMCFlasher on the PC to get a window like that shown in Figure 6.

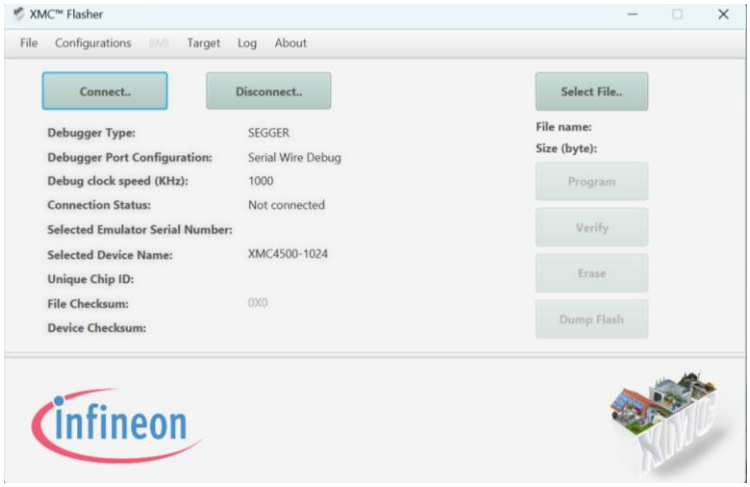

Figure 6. XMCFlasher Programming Tool

Step 5. Make sure the XMCFlasher configuration is set for Serial Wire Debug and not JTAG (Figure 7). Some of the OPS243 version D2 boards require setting to JTAG. If you find XMCFlasher does not connect to your OPS243 version D2 or later board, select JTAG as the Debugger Type. The Interface Setup is found under Configuration – Setup… Make sure the "Reset and verify content after programming" box is also checked off.

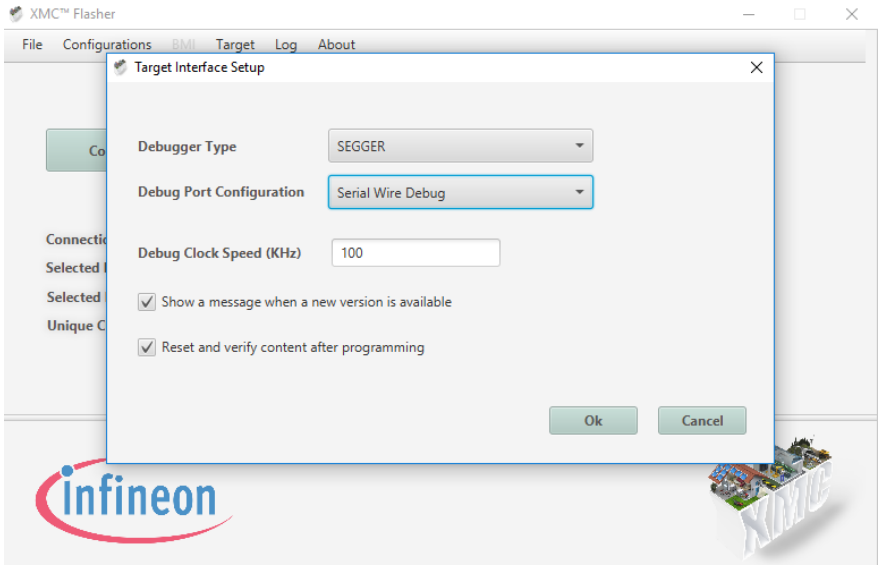

Figure 7. Serial Interface Setting

Step 6. With the OPS241/OPS242/OPS243 connected to the PC, press the Connect button on XMCFlasher. A pop-up window like that in Figure 8 will appear. For the OPS241/OPS242, scroll down and select the XMC4200-256 and press Ok. For the OPS243, there are two options to choose depending on your board version. Some version D2 and later sensors use the XMC4700 while most others use the XMC4500. Check which processor is used by issuing a ?P API command. Once the processor to select is known, scroll down and select the appropriate sensor as shown in Figure 9 and press Ok.

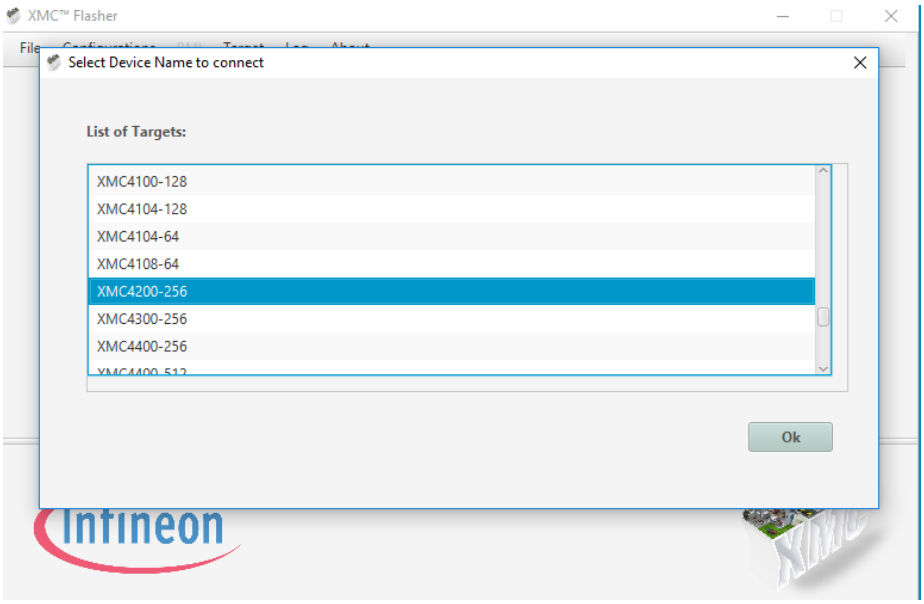

Figure 8. XMCFlasher Device Selection Window – OPS241/OPS242

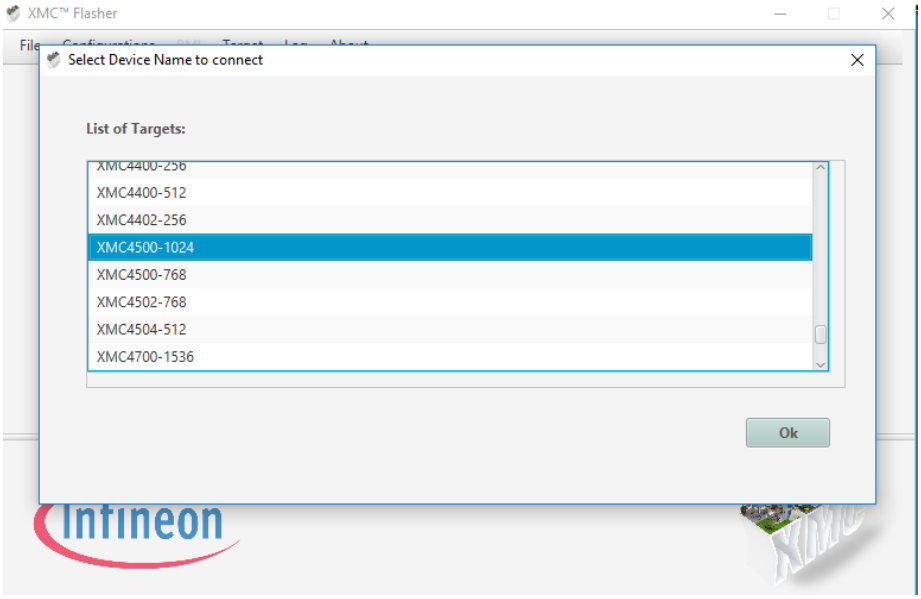

Figure 9. XMCFlasher Device Selection - OPS243

Step 7. The window will change and show the Connected Status as Connected (Figure 10). Additional information about the device will be shown including the Unique Chip ID. The Unique Chip ID will be a long line of random numbers and letters. If the Unique Chip ID shows 00, the XMCFlasher is not connected to the sensor and will not program correctly. Check that the Segger is plugged in or reverse the connector cable on the Segger side which is not keyed.

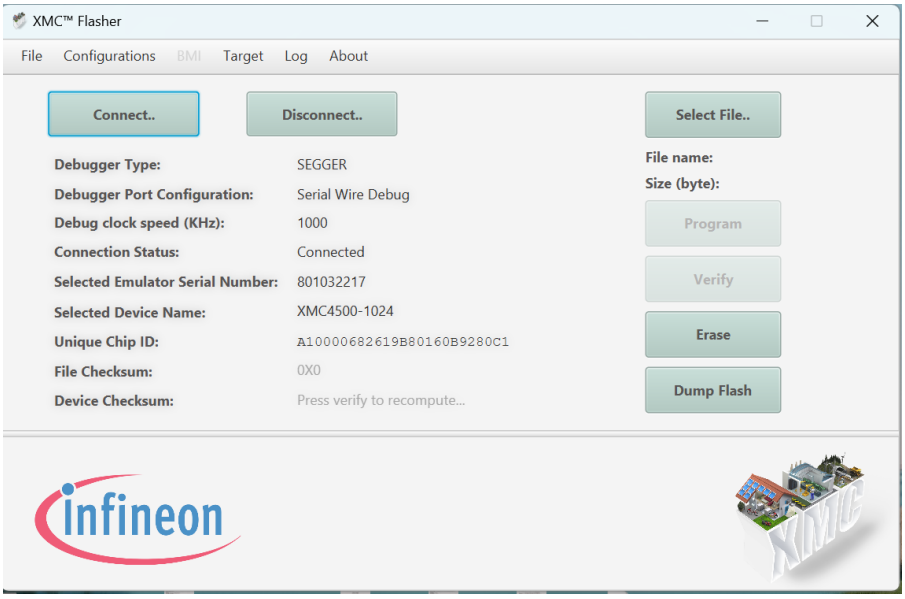

Figure 10. XMCFlasher Connected State Window

Step 8. Next, click on Select File and browse to the location of the hex file with the code to be updated on the OPS241/OPS242/OPS243. The name of the file will show up under the Select File button (Figure 11). Contact OmniPreSense customer service to obtain the latest code version.

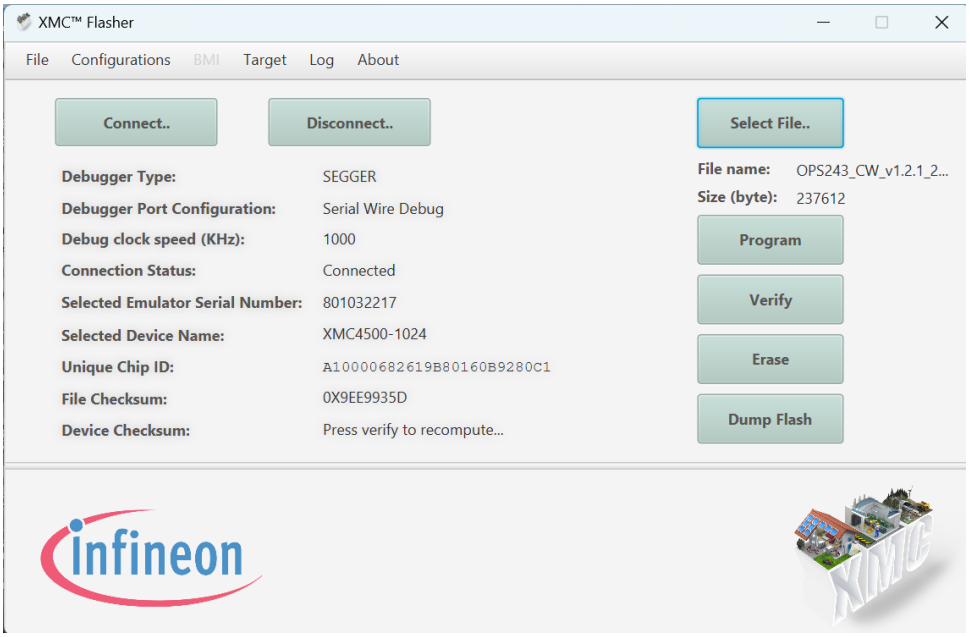

Figure 11. Hex File Selection

Step 9. Press Program to start the flashing process. A pop-up of rolling balls along with a status box will appear while the flashing in process (Figure 12). Typically, it only takes a few seconds to complete the flashing process. Do not press the Erase button. OmniPreSense saves factory settings in some sensors and pressing the Erase button will clear those out as well as any persistent memory settings which have been saved.

Figure 12. Sensor Flashing in Process

Step 10. Upon a successful re-flashing, a pop-up window will appear indicating a success (Figure 13). Click Ok and followed by the Disconnect button. The sensor can now be unplugged from the JTAG programmer and PC.

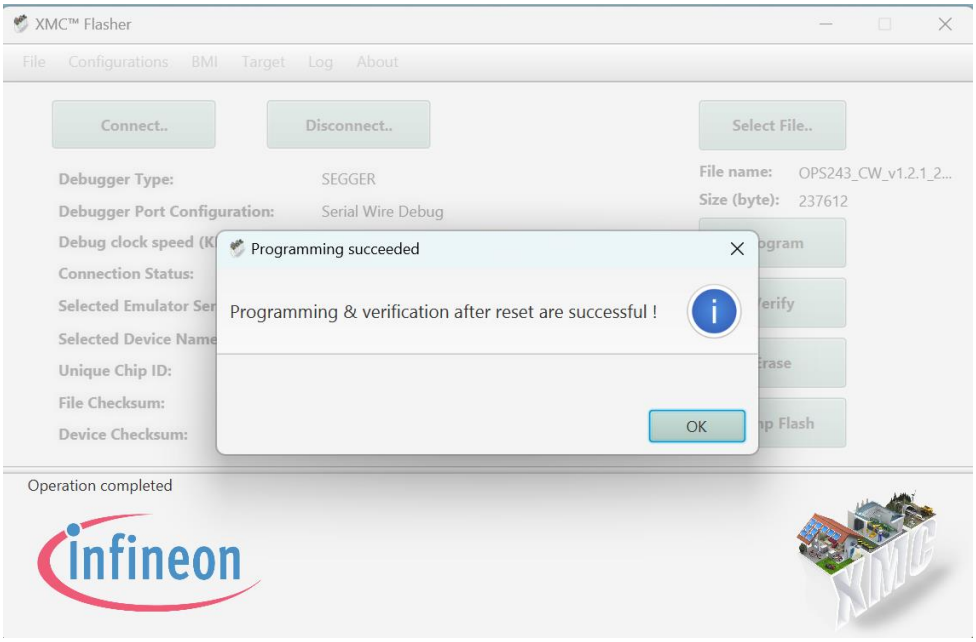

Figure 13. Successful Flashing of Sensor

You can check the programming was successful by plugging the board back into the USB port on the PC and using Tera Term to validate the new code is programmed and runs. Start Tera Term and it will automatically detect which port the board is connected to. Select the Serial button with the proper port

selection. You should see speed data (m/s) start to stream from the board while waving your hand above the board. Press ?? to report the board information and note the Version number is correct for the expected code which has been programmed (Figure 14).

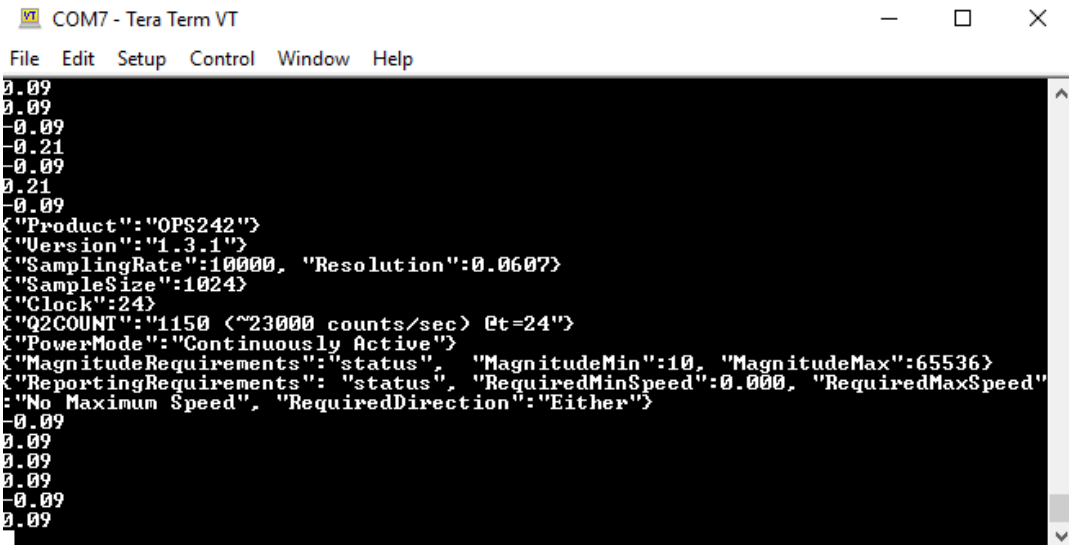

Figure 14. Programmed Board Validation

Revision History

Version	Date	Description
A	November 13, 2017	Initial release.
B	November 26, 2018	Updated with newer re-flashing tools.
C	February 26, 2019	Added new step 5 to check for serial setting as opposed to JTAG.
D	June 19, 2019	Updated with support for OPS243. Added clarification not to use Erase button.
E	July 29, 2022	Updated information about rev D2 boards and removed comments about 1st generation OPS241 board.
F	February 18, 2025	Corrected Segger connection position Added comments about installing J-Link software Updated screenshots