

Flashing RAK4630 bootloader with JLink

Required:

J-Flash (I use latest V7.58b) → <https://www.segger.com/products/debug-probes/j-link/technology/flash-download/>

WisBlock RAK4630 bootloader → <https://github.com/RAKWireless/WisBlock/tree/master/bootloader/RAK4630/Latest>

as Hex file → [WisCore_RAK4631_Board_Bootloader.hex](#)

Remarks:

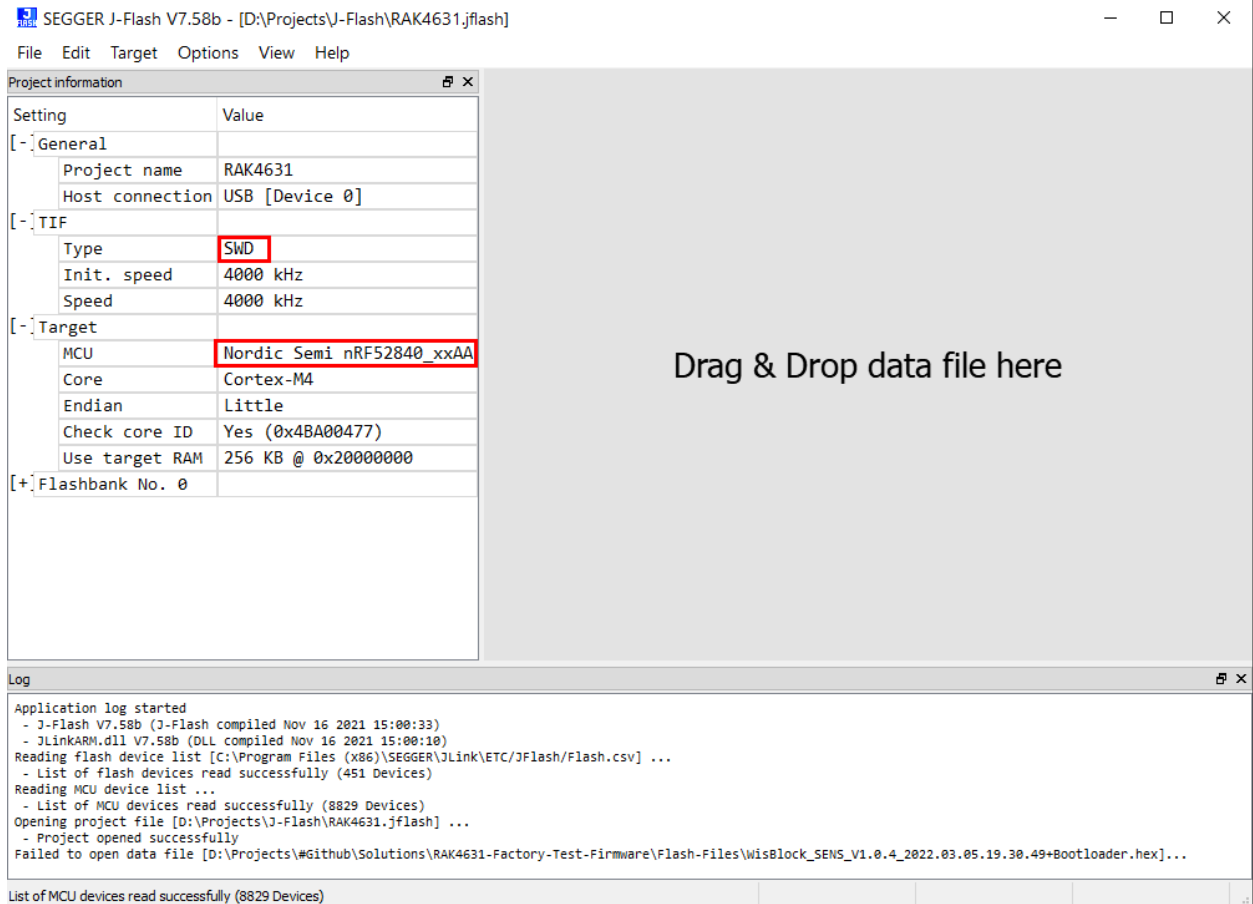
After flashing the bootloader, the application on the RAK4630 is erased. You need to flash your application again with ArduinoIDE or PlatformIO.

Make sure the RAK4630 is powered over USB. The JLink cannot power the module.

1) Start J-Flash and setup the device

Choose MCU Nordic Semi nRF52840_xxAA

Choose SWD as interface and 4000 kHz



The screenshot shows the SEGGER J-Flash V7.58b software interface. The main window displays project settings for a project named 'RAK4631'. The settings are organized into sections: General, TIF, Target, and Flashbank. The 'TIF' section is expanded, showing 'Type' set to 'SWD', 'Init. speed' set to '4000 kHz', and 'Speed' set to '4000 kHz'. The 'Target' section is also expanded, showing 'MCU' set to 'Nordic Semi nRF52840_xxAA', 'Core' set to 'Cortex-M4', 'Endian' set to 'Little', 'Check core ID' set to 'Yes (0x4BA00477)', and 'Use target RAM' set to '256 KB @ 0x20000000'. The 'Flashbank' section is collapsed, showing 'Flashbank No. 0'. A large grey area on the right side of the window contains the text 'Drag & Drop data file here'. Below the settings window is a 'Log' window showing the application log, which includes the following text:

```
Application log started
- J-Flash V7.58b (J-Flash compiled Nov 16 2021 15:00:33)
- JLinkARM.dll V7.58b (DLL compiled Nov 16 2021 15:00:10)
Reading flash device list [C:\Program Files (x86)\SEGGER\JLink\ETC\JFlash\Flash.csv] ...
- List of flash devices read successfully (451 Devices)
Reading MCU device list ...
- List of MCU devices read successfully (8829 Devices)
Opening project file [D:\Projects\J-Flash\RAK4631.jflash] ...
- Project opened successfully
Failed to open data file [D:\Projects\#Github\Solutions\RAK4631-Factory-Test-Firmware\Flash-Files\WisBlock_SENS_V1.0.4_2022.03.05.19.30.49+Bootloader.hex]...
```

At the bottom of the log window, the text 'List of MCU devices read successfully (8829 Devices)' is visible.

2) Connect JLink adapter to the RAK4630

Make sure that the RAK4630 is powered from USB. JLink cannot power up the RAK4630.



3) Load the RAK4630 bootloader into J-Flash application

The screenshot displays the SEGGER J-Flash V7.58b application window. The title bar reads "SEGGER J-Flash V7.58b - [D:\Projects\J-Flash\RAK4631.jflash *]". The menu bar includes "File", "Edit", "Target", "Options", "View", and "Help".

The "Project information" tab is active, showing a table of settings:

Setting	Value
[-] General	
Project name	RAK4631
Host connection	USB [Device 0]
[-] TIF	
Type	SWD
Init. speed	4000 kHz
Speed	4000 kHz
[-] Target	
MCU	Nordic Semi nRF52840_xxAA
Core	Cortex-M4
Endian	Little
Check core ID	Yes (0x4BA00477)
Use target RAM	256 KB @ 0x20000000
[+] Flashbank No. 0	

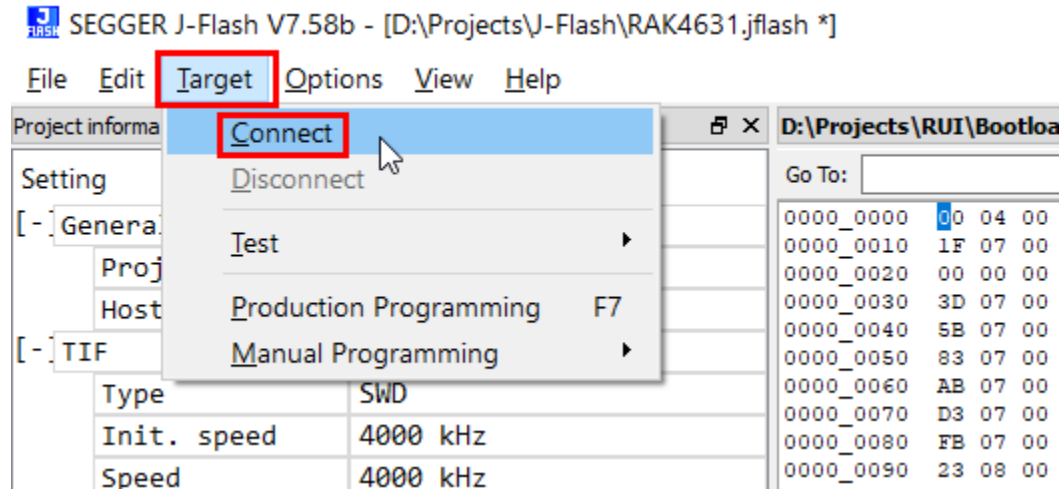
The "Go To:" field is set to "D:\Projects\RUI\Bootloader\WisCore_RAK4631_Board_Bootloader.hex @ 00000000". Below this, a hex viewer displays the data from the file, showing addresses from 0000_0000 to 0000_01D0 and their corresponding hexadecimal values.

The "Log" window at the bottom shows the following messages:

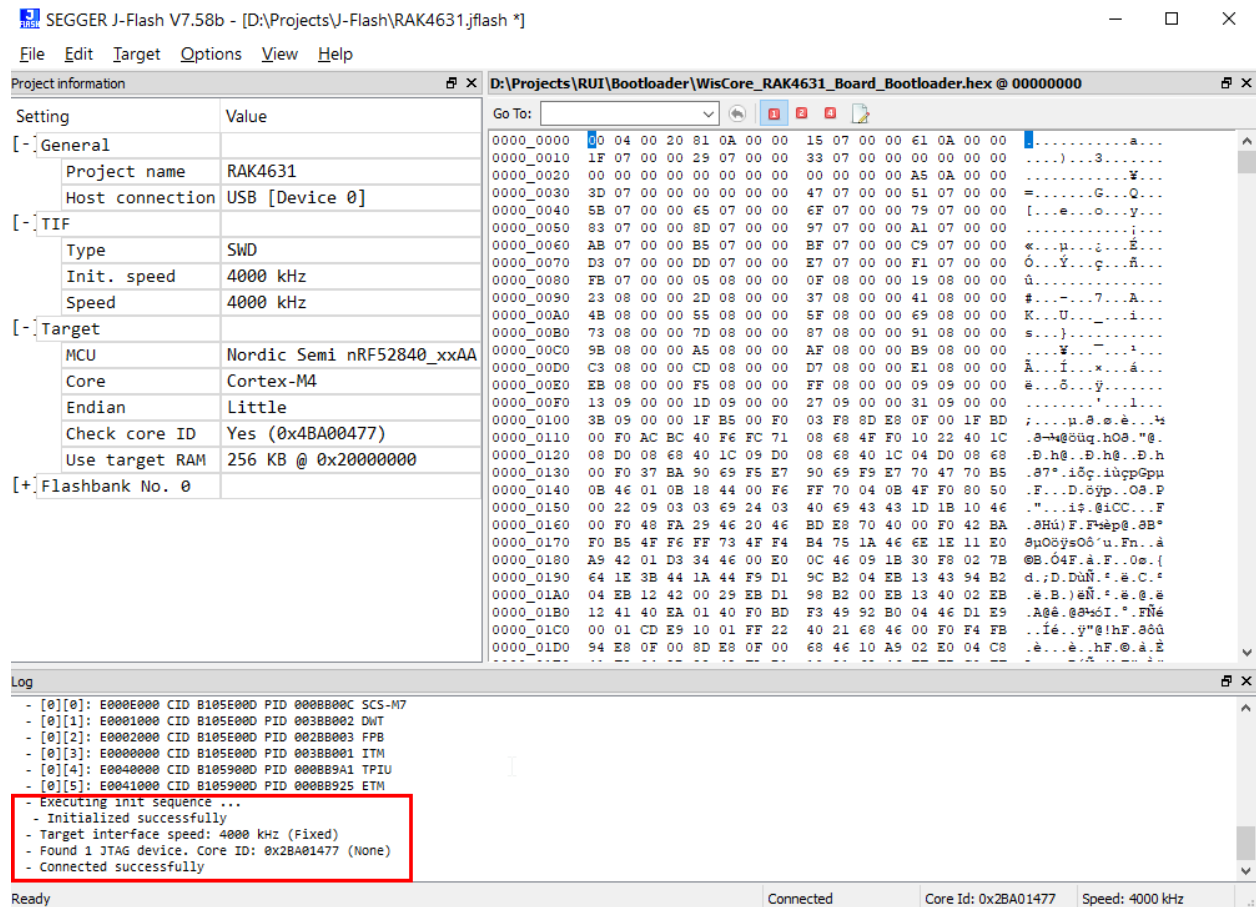
```
- J-Flash V7.58b (J-Flash compiled Nov 16 2021 15:00:33)
- JLinkARM.dll V7.58b (DLL compiled Nov 16 2021 15:00:10)
Reading flash device list [C:\Program Files (x86)\SEGGER\JLink\ETC\JFlash\Flash.csv] ...
- List of flash devices read successfully (451 Devices)
Reading MCU device list ...
- List of MCU devices read successfully (8829 Devices)
Opening project file [D:\Projects\J-Flash\RAK4631.jflash] ...
- Project opened successfully
Failed to open data file [D:\Projects\Github\Solutions\RAK4631-Factory-Test-Firmware\Flash-Files\WisBlock_SENS_V1.0.4_2022.03.05.19.30.49+Bootloader.hex]...
Opening data file [D:\Projects\RUI\Bootloader\WisCore_RAK4631_Board_Bootloader.hex] ...
- Data file opened successfully (186344 bytes, 5 ranges, CRC of data = 0x09BE89D4, CRC of file = 0xFC60BD2)
```

The status bar at the bottom indicates "Ready".

4) Connect J-Flash to the device



On successful connection, the J-Flash will show



4) Start flashing the bootloader

I am using F7, Production Programming

The screenshot shows the SEGGER J-Flash V7.58b software interface. The 'Target' menu is open, and 'Production Programming' is selected. The main window displays the target configuration and a hex dump of the bootloader code.

Type	SWD
Init. speed	4000 kHz
Speed	4000 kHz

Property	Value
MCU	Nordic Semi nRF52840_xxAA
Core	Cortex-M4
Endian	Little
Check core ID	Yes (0x4BA00477)
Use target RAM	256 KB @ 0x20000000

Flashbank No. 0

```
0000_0000 00 04 00 20 81 0A 00 00 15 07 00 00 61 0A 00 00 .....a...
0000_0010 1F 07 00 00 29 07 00 00 33 07 00 00 00 00 00 00 .....3...
0000_0020 00 00 00 00 00 00 00 00 00 00 00 00 A5 0A 00 00 .....Y...
0000_0030 3D 07 00 00 00 00 00 00 47 07 00 00 51 07 00 00 .....G...Q...
0000_0040 5B 07 00 00 65 07 00 00 6F 07 00 00 79 07 00 00 [...]e...O...y...
0000_0050 83 07 00 00 8D 07 00 00 97 07 00 00 A1 07 00 00 .....j...
0000_0060 AB 07 00 00 B5 07 00 00 BF 07 00 00 C9 07 00 00 <...p...g...E...
0000_0070 D3 07 00 00 DD 07 00 00 E7 07 00 00 F1 07 00 00 Ó...Y...g...ã...
0000_0080 FB 07 00 00 05 08 00 00 0F 08 00 00 19 08 00 00 ú...
0000_0090 23 08 00 00 2D 08 00 00 37 08 00 00 41 08 00 00 #...7...A...
0000_00A0 4B 08 00 00 55 08 00 00 5F 08 00 00 69 08 00 00 K...U...i...
0000_00B0 73 08 00 00 7D 08 00 00 87 08 00 00 91 08 00 00 s...}...
0000_00C0 9B 08 00 00 A5 08 00 00 AF 08 00 00 B9 08 00 00 ...V...
0000_00D0 C3 08 00 00 CD 08 00 00 D7 08 00 00 E1 08 00 00 Å...I...x...ä...
0000_00E0 EB 08 00 00 F5 08 00 00 FF 08 00 00 09 09 00 00 ë...ö...y...
0000_00F0 13 09 00 00 1D 09 00 00 27 09 00 00 31 09 00 00 .....1...
0000_0100 3B 09 00 00 1F B5 00 F0 03 F8 8D E8 0F 00 1F BD ;...p...ø...è...t...
0000_0110 00 F0 AC BC 40 F6 FC 71 08 68 4F F0 10 22 40 1C .8-4@0üq.h08."@.
0000_0120 08 D0 68 68 40 1C 09 D0 08 68 40 1C 04 D0 08 68 .D.h@...D.h@...D.h
0000_0130 00 F0 37 BA 90 69 F5 E7 90 69 F9 E7 70 47 70 B5 .87*.iôg.iüppGpu
0000_0140 0B 4E 01 0B 18 44 00 F6 FF 70 04 0B 4F F0 80 50 .F...D.ôyp...Oa.P
0000_0150 00 22 09 03 03 69 24 03 40 69 43 43 1D 1B 10 46 ."...is.âiCC...F
0000_0160 00 F0 48 FA 29 46 20 46 BD E8 70 40 00 F0 42 BA .8Hú)F.Fhèp@.8B*
0000_0170 F0 B5 4F F6 FF 73 4F F4 B4 75 1A 46 6E 1E 11 E0 8µ0ôÿs0ô"u.Fn.â
0000_0180 A9 42 01 D3 34 46 00 E0 0C 46 09 1B 30 F8 02 7B @B.Ô4F.â.F...0e.{
0000_0190 64 1E 3B 44 1A 44 F9 D1 9C B2 04 EB 13 43 94 B2 d.;D.DuN.*.è.C.*
0000_01A0 04 EB 12 42 00 29 EB D1 98 B2 00 EB 13 40 02 EB .è.B.)eN*.è.C.è
0000_01B0 12 41 40 EA 01 40 F0 BD F3 49 92 B0 04 46 D1 E9 .A@è.@846I.*.FÑè
0000_01C0 00 01 CD E9 10 01 FF 22 40 21 68 46 00 F0 F4 FB ..Ié...y"@!hF.8ôû
0000_01D0 94 E8 0F 00 8D E8 0F 00 68 46 10 A9 02 E0 04 C8 .è...è...hF.@.â.È
```

Log

- [0][0]: E000E000 CID 8105E000 PID 0008B00C SCS-M7
- [0][1]: E0001000 CID 8105E000 PID 0038B002 DWT
- [0][2]: E0002000 CID 8105E000 PID 0028B003 FPB
- [0][3]: E0000000 CID 8105E000 PID 0038B001 ITM
- [0][4]: E0040000 CID 81059000 PID 0008B9A1 TPIU
- [0][5]: E0041000 CID 81059000 PID 0008B925 ETM
- Executing init sequence ...
- Initialized successfully
- Target interface speed: 4000 kHz (Fixed)
- Found 1 JTAG device. Core ID: 0x2BA01477 (None)
- Connected successfully

Erase, program and verify target Connected Core Id: 0x2BA01477 Speed: 4000 kHz

During flashing, a small window will pop up and show the status until it shows

The dialog box displays the following message:

Target erased, programmed and verified successfully - Completed after 6.342 sec

OK

I the J-Flash log you should see

The screenshot displays the SEGGER J-Flash V7.58b interface. The main window title is "SEGGER J-Flash V7.58b - [D:\Projects\J-Flash\RAK4631.jflash *]". The menu bar includes "File", "Edit", "Target", "Options", "View", and "Help".

The "Project information" tab is active, showing a table of settings:

Setting	Value
[-] General	
Project name	RAK4631
Host connection	USB [Device 0]
[-] TIF	
Type	SWD
Init. speed	4000 kHz
Speed	4000 kHz
[-] Target	
MCU	Nordic Semi nRF52840_xxAA
Core	Cortex-M4
Endian	Little
Check core ID	Yes (0x4BA00477)
Use target RAM	256 KB @ 0x20000000
[+] Flashbank No. 0	

The "Go To:" field is empty. The main window displays a hex dump of the bootloader file "D:\Projects\RUI\Bootloader\WisCore_RAK4631_Board_Bootloader.hex @ 00000000". The log window at the bottom shows the following messages:

```
- 0x0000 - 0x25FFF ( 38 Sectors, 152 KB)
- 0xF4000 - 0xFBFFF ( 8 Sectors, 32 KB)
- 0xFD000 - 0xFDFFF ( 1 Sector, 4 KB)
- 0x10001000 - 0x10001FFF ( 1 Sector, 4 KB)
- Start of verifying flash
- End of verifying flash
- Start of restoring
- End of restoring
- Executing exit sequence ...
- De-initialized successfully
- Target erased, programmed and verified successfully - Completed after 6.342 sec
```

The status bar at the bottom indicates "Ready", "Connected", "Core Id: 0x2BA01477", and "Speed: 4000 kHz".