

Installing the Keil MDK for Nuvoton Edition

Version 1.2.1

Application Note

Non-Confidential

Issue

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Installing the Keil MDK for Nuvoton Edition Application Note

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This document (kan342_1.2.1_en) was issued on 2024-10-24. There might be a later issue at https://developer.arm.com/documentation/kan342

The product version is 1.2.1.

See also: Proprietary notice | Product and document information | Useful resources

Start reading

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Embedded Software and Firmware Developers.

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1. Abstract

Arm offers software developers working with Nuvoton devices based on the Arm Cortex-M processor cores a free-to-use professional Keil MDK v6 tool suite.

This edition includes all tools and software components delivered with Keil MDK v6.

This application note explains how to download, install, and use MDK with Nuvoton devices.



Keil MDK v6 with user-based licensing only supports Arm Compiler 6 and onwards. If you need to take care of a legacy project requiring Arm Compiler 5, please contact support for help.

2. Installation

This chapter explains how to download and install Keil MDK on your local computer.

Keil uVision (Windows only)

- 1. Download the installer.
- 2. Run the downloaded MDK5xx.exe installer.
- 3. Select your installation location. If you have existing MDK installations that you want to keep, select a new folder. Once the installation has finished, Pack Installer opens.
- 4. In Pack Installer, click **Install** to download and install a device family pack supplied by Nuvoton.

🚵 Pack Installer — 🗆 🗙				
File Packs Window Help	File Packs Window Help			
2 Device: Nuvoton - NuMicro M23 Fa	mily			
4 Devices Boards	4	Packs Examples		4
Search: Nuvoton - X	Ē	Show deprecated packs also		
Device /	Summary	Pack	Action	Description
🖃 😤 All Devices	924 Devices	🖃 - Davice Specific	1 Dack	NuMicro M23 Family selected
🖃 🖉 Nuvoton	924 Devices	Nuvoton::NuMicro_DFP	🚸 Install	Juvoton ARM Cortex-M NuMicro Family Device Support
🗄 😤 ISD Family	27 Devices	Generic	415 Packs	
🕀 🕂 NPCX Family	2 Devices		🚸 Install	AzureRTOS support for Alif Semiconductor M55_HP and M55_
🕀 🔧 NuMicro M0 Family	472 Devices	AlifSemiconductor::Dave2DDriver	🚸 Install+	Alif Semiconductor D/AVE2D driver CMSIS package
🕀 🔧 NuMicro M0+ Family	19 Devices		🚸 Install+	FreeRTOS Components support for Alif Semiconductor M55_H
🗄 🔧 NuMicro M4 Family	201 Devices	■ AlifSemiconductor::LVGL_DAVE2D	🚸 Install+	Alif Semiconductor D/AVE2D driver CMSIS package
🕀 🕂 NuMicro M7 Family	40 Devices	AnalogDevices::ADSP-SC83x_Fre	🚸 Install+	OS Abstraction Layer binding for FreeRTOS.
🖽 🧚 NuMicro M23 Family	127 Devices		🚸 Install	OASIS PKCS #11 Cryptographic Token Interface
🕀 🏤 🕸 NuMicro M55 Family	1 Device	Arm-Packs::Unity	🚸 Install	Unit Testing for C (especially Embedded Software)
🗄 🔧 NuVoice Family	35 Devices	ARM::Arm-2D	🚸 Install	A 2D graphic library optimized for Cortex-M processors.
			🚸 Up to date	CMSIS (Common Microcontroller Software Interface Standard
			🚸 Up to date	CMSIS Compiler extensions for Arm Compiler, GCC, Clang, ar
			🚸 Up to date	CMSIS Drivers for external devices
		ARM::CMSIS-Driver_Validation	🚸 Install+	CMSIS-Driver Validation
Output		1		ф ×
Ready				ONLINE

Figure 2-1: Install Nuvoton CMSIS-Packs

Next, you need to activate your product.

Keil Studio

- 1. Download and install Microsoft Visual Studio Code on your computer.
- 2. Once installed, open the **Extensions** in the activity bar.

Figure 2-2: Open the extensions



3. Search for Keil Studio Pack and install the extension.

Next, you need to activate your product.

3. Activation

This chapter explains how to activate your product.

Keil uVision

Open uVision and go to File – License Management... and select the User-Based License tab.

Click the button **Activate / Deactivate**.

Figure 3-1: License Management - User-Based License

Single-User License Floating License Floating License Administrator FlexNet Licen Customer Information	se User-Based License	
Customer Information Name: Company: Email: Imail: Imail: Valicense Information Product Name: Valid until: Cached until: Notice: No user-based license registered.		
License Information Product Name: Valid until: Cached until: Notice: No user-based license registered.		
Notice: No user-based license registered.		
	•	
Activate / Deactivate		

Continue in the Arm License Management Tool.

Keil Studio

Open Visual Studio Code and press Ctrl + Shift + p (Cmd + Shift + p on macOS). In the command box, enter manage and select **Environment: Manage tools licenses**:

Figure 3-2: Run the manage tools licenses command

>manage	
Environment: Manage tool licenses	
Accounts: Manage Trusted Extensions For Account	other commands

Continue in the Arm License Management Tool.

Arm License Management Tool

Figure 3-3: Arm License Management Utility

Arm License Management Utility 1.3.0		6	×
Activate your product	Activate with:	○ Activation Code	• License Server
	Enter your license s	erver address:	
2			3 Query
	Select the product t	to activate:	
	Keil MDK Nuvoton	Edition - Full Cortex-M	~ 4 Activate
Q ₁		Help	Close
		· · · · · ·	

- 1. Enable License Server.
- 2. To get the license server address, please visit https://www.nuvoton.com/keil.
- 3. Click the **Query** button. Make sure that the "Keil MDK Nuvoton Edition Full Cortex-M" is shown.
- 4. Click on **Activate**. The window changes and shows the information of the activated license:

Figure 3-4: Arm License Activated

Arm License Management Utility 1.3.0		- 🗆 X
Activate your product	Keil MDK Nuvoton Edition - Full Cortex-M	Deactivate
Keil MDK Nuvoton Edition - Full Cortex-M Expires: September 26, 2034	Order Id: free-of-charge License server: https://	
	Expires on: September 26, 2034 Cache expires on: October 3, 2024	
	Help	Close

Next, test your set up using an example project.

4. Example Projects

This chapter shows how to use example projects from Nuvoton to check the correct set up of the hardware and software.

4.1 Keil uVision

Example projects for Nuvoton are available in MDK project format.

- 1. Go to Nuvoton's web site.
- 2. Search for an appropriate series and download the ZIP file with the sample code onto your PC.
- 3. Unzip the file and double-click the uvproj(x) uVision project file.
- 4. uVision opens and loads the project.

If you see a warning about "missing devices", you can safely ignore this message.

Figure 4-1: Device Support Check Warning



5. Build the project.

Figure 4-2: Nuvoton Arm Cortex-M23 project built successfully



4.2 Keil Studio

Keil Studio is able to use uVision projects after conversion.

Arm Cortex-M23 and Cortex-M55 based devices

Example projects for Arm Cortex-M23 and Cortex-M55 based devices from Nuvoton are available in MDK v5 project format.

- 1. Go to Nuvoton's web site.
- 2. Search for an appropriate series and download the ZIP file with the sample code onto your PC.
- 3. Unzip the file.
- 4. Open Keil Studio and go to File Open Folder.
- 5. Use your file manager to browse to the unzipped directory and pen the sub-folder "KEIL".

6. Right-click the uvprojx file and select **Convert uvproj to csolution**:

Figure 4-3: Convert uvprojx to csolution

刘 - Е	File Edit Selection View Go Run	Terminal Help \leftarrow	\rightarrow
С	EXPLORER		🗙 Welcome 🛛 🗙
	∼ KEIL		
ρ	■ M2L31_LPUART_RX_in_PD.uvoptx		
	■ M2L31_LPUART_RX_in_PD.uvprojx		
وع	≡ Nu_Link_Driver.ini	Open to the Side	Ctrl+Enter
õ		Open With	
		Reveal in File Explorer	Shift+Alt+R
₽́		Open in Integrated Ter	rminal
Щ		Configure Arm Tools E	nvironment
CMSIS		Select for Compare	
~~~		Open Timeline	
.765		Cut	Ctrl+X
		Сору	Ctrl+C
		Copy Path	Shift+Alt+C
		Copy Relative Path	Ctrl+K Ctrl+Shift+C
		Rename	F2
		Delete	Delete
		Convert uvproj to csole	ution



You might get a warning that after build steps cannot be converted. You can ignore this message.

7. Open the CMSIS extension (1) and use the hammer icon (2) to build the project:

#### Figure 4-4: Build the project

<b>×</b> F	File Edit Selection View G reminal Help $\epsilon$	- →
C	CMSIS: M2L31_LPUART_RX_IN_PD 📏 ▷ ☆ 앱 @ @ …	✓ Welcome ×
ρ	✓	Start
⁄ የ o	✓  ↓ CMSIS similar trup_M2L31.s	C+ New File
<u>ح</u> ل	C system_M2L31.c	ʿ∐ Open File D⊃ Open Folder
æ	C clk.c	Connect to
₿	C gpio.c C lppdma.c	Recent
CMSIS	C Ipuart.c C retarget.c	MDK_ARMv5 C:\Projects\Holtek\HT32F0008
~~~	C sys.c C uart.c	KEIL C:\P\SampleCode\ExampleCode\EC_M2L31_LPADC_ResultMo KEIL C:\Projects\EC_M2L31_LPADC_ResultMonitor_Wakeup_NPD4
.769	✓ [□ User C main c	KEII CAProiectelNiuvoton/M32SamoleCora/SamoleCorda/Evamole PRORIEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
		XinPD [1/11] Building AS_ARM object CMakeFiles/M2L31_LPUART_RX_in_PD.c Warning: A1950W: The legacy armasm assembler is deprecated. Cons
		0 Errors, 1 Warning
		<pre>[2/11] Building C object CMakeFiles/M2L31_LPUART_RX_in_PD.dir/C [3/11] Building C object CMakeFiles/M2L31_LPUART_RX_in_PD.dir/C [4/11] Building C object CMakeFiles/M2L31_LPUART_RX_in_PD.dir/C [5/11] Building C object CMakeFiles/M2L31_LPUART_RX_in_PD.dir/C [6/11] Building C object CMakeFiles/M2L31_LPUART_RX_in_PD.dir/C [7/11] Building C object CMakeFiles/M2L31_LPUART_RX_in_PD.dir/C [8/11] Building C object CMakeFiles/M2L31_LPUART_RX_in_PD.dir/C [9/11] Building C object CMakeFiles/M2L31_LPUART_RX_in_PD.dir/C [9/11] Building C object CMakeFiles/M2L31_LPUART_RX_in_PD.dir/C [10/11] Building C object CMakeFiles/M2L31_LPUART_RX_in_PD.dir/C [11/11] Linking C executable C:\P\E\SampleCode\ExampleCode\M2L32 L31_LPUART_RX_in_PD.axf Program Size: Code=3488 RO-data=1180 RW-data=1028 ZI-data=4276</pre>
		info cbuild: build finished successfully!

All other Cortex-M based devices

Example projects for Arm Cortex-M0/M0+/M4/M7 based devices from Nuvoton require an additional conversion step as they are shipped in the old MDK v4 project format.

- 1. Go to Nuvoton's web site.
- 2. Search for an appropriate series and download the ZIP file with the sample code onto your PC.
- 3. Unzip the file and double-click the uvproj uVision project file.
- 4. uVision opens and loads the project.
- 5. Go to Project Manage Migrate to Version 5 Format...

Figure 4-5: Project - Manage - Migrate to Version 5 Format...



6. Once the migration is done and the uvprojx file is generated, you can continue as described in the previous section.

Further reading

Congratulations! You can now start working on embedded software development for Nuvoton devices!

If you want to learn more about Keil MDK, download the Getting Started Guide.

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Product and document information

Read the information in these sections to understand the release status of the product and documentation, and the conventions used in Arm documents.

Product status

All products and services provided by Arm require deliverables to be prepared and made available at different levels of completeness. The information in this document indicates the appropriate level of completeness for the associated deliverables.

Product completeness status

The information in this document is Final, that is for a developed product.

Revision history

These sections can help you understand how the document has changed over time.

Document release information

The Document history table gives the issue number and the released date for each released issue of this document.

Document history

Issue	Date	Confidentiality	Change
1.2.1	24 October 2024	Non-Confidential	Minor correction
1.2.0	20 September 2024	Non-Confidential	Updates for user-based licensing
1.1.0	12 January 2023	Non-Confidential	Minor corrections
1.0.0	11 January 2023	Non-Confidential	Initial release

Change history

The Change history tables describe the technical changes between released issues of this document in reverse order. Issue numbers match the revision history in Document release information on page 17.

Table 2: Issue 1.0.0



Conventions

The following subsections describe conventions used in Arm documents.

Glossary

The Arm Glossary is a list of terms used in Arm documentation, together with definitions for those terms. The Arm Glossary does not contain terms that are industry standard unless the Arm meaning differs from the generally accepted meaning.

See the Arm Glossary for more information: developer.arm.com/glossary.

Typographic conventions

Arm documentation uses typographical conventions to convey specific meaning.

Convention	Use
italic	Citations.
bold	Interface elements, such as menu names.
	Terms in descriptive lists, where appropriate.
monospace	Text that you can enter at the keyboard, such as commands, file and program names, and source code.
monospace <u>underline</u>	A permitted abbreviation for a command or option. You can enter the underlined text instead of the full command or option name.
<and></and>	Encloses replaceable terms for assembler syntax where they appear in code or code fragments. For example:
	MRC p15, 0, <rd>, <crn>, <crm>, <opcode_2></opcode_2></crm></crn></rd>
SMALL CAPITALS	Terms that have specific technical meanings as defined in the <i>Arm® Glossary</i> . For example, IMPLEMENTATION DEFINED , IMPLEMENTATION SPECIFIC , UNKNOWN , and UNPREDICTABLE .



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