

Micro-Controller Experiment

Week1

Teacher: 廖裕評 Yu-Ping Liao

TA: 陳大荃 Da-chuan Chen, 陳恩妮 En-ni Chen

Class Rules

1. No drink besides water.
2. Bring a laptop and breadboard if needed.
3. Ask us TAs to sign and borrow development boards. Do not sign or ask others to sign for you without TAs' permission.
4. Arriving 10 minutes after the bell rings will be regarded as absent.
5. If you damage any borrowed equipment, you have to pay for it.

Homework Rules

1. Includes: A. Class content, B. Class exercise, C. Homework (screenshot or video)
2. Editing software: MS PowerPoint
3. File format: PDF
4. Filename: "date_group_studentID_name.pdf", like "0916_第1組_11028XXX_陳OO.pdf"
5. The homework deadline is 23:59 of the day before the next class. If you are late, then your grade will be deducted.

Contact

If you encounter any problems with this class, please get in touch with us with the following E-mails:

1. Teacher, Prof. Yu-Ping Liao 廖裕評 : lyp@cycu.org.tw
2. TA, Da-chuan Chen 陳大荃 : dachuan516@gmail.com
3. TA, En-ni Chen 陳恩妮 : anna7125867@gmail.com

Or visit 篤信 Lab353 for further questions.

Outline of the Week

1. Find installation guides.
2. IDE installation.
3. Firmware library installation.
4. Create a new project.
5. Homework W1-1.

The background features a series of concentric circles in light gray, some solid and some dashed, creating a ripple effect. A bright red callout box is centered, containing the text "Find Installation Guides".

Find Installation
Guides

1. Look for info page

[Home](#)[Products](#)[Applications](#)[MCU Tools](#)[About Holtek](#)[Buy online](#)[English](#)[Sign In](#)[Home](#) / [MCU Tools](#) / [Development Kit](#) / [ESK32-30501](#)

ESK32-30501 – HT32F52352 Starter Kit

[Buy online →](#)

The HT32F52352 Starter Kit uses the 32-bit Arm® Cortex®-M0+ high performance, low-power microcontroller, and is designed to help new users get up and running and using this Holtek device in the shortest possible time frame. It provides a low-cost platform which together with the software development platform, also provides a complete solution from evaluation, programming to production.


Characteristics

- Designed to get users started with the Cortex®-M0+, by providing a low-cost platform. Together with the convenience of its software development platform, it provides a complete solution from evaluation to production
- Using HT32F52352 high performance, low-power microcontroller
 - Up to 48MHz operating frequency
 - 128KB Flash 、 16KB SRAM
 - Integrated multiple Timers, dual I²C functions, dual SPI functions, dual USART functions, dual UART functions, single 12-bit A/D converter, USB, I²S and EBI function
 - Can be used for the testing and development of many external devices
 - 64LQFP package
 - 8.000 MHz External Crystal Clock
 - 51 programmable general purpose I/O pins
- Comprises Target Board and Serial-Wire Debugger
- Can use the Target Board external power supply or be powered by the e-Link32 Pro USB supply


Development Environment


- Provides a standard C language program development environment
- Provides a comprehensive functional library avoiding much complicated lower level functional development
- Integrated hardware debug interface, SWD, connects to the IDE using a USB. The system will download the programs and debug immediately
- Rich development solution: Keil MDK-ARM, IAR EWARM, SEGGER Embedded Studio, GNU Toolchain


2. Look for documentation.

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English ▾

 Sign In

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**Box Content Items**

Starter Kit	1
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**Documents / Software**

Combined products / optional accessories:

ESK32-20001/20001A
ESK32-21001

Documentation:

[IC Data Sheet](#)
[IC User Manual](#)
[Starter Kit User Manual](#)
[Starter Kit Schematics](#)
[Tool chain Quick Start Guide](#)
- Keil MDK-ARM
- IAR EWARM
[Free Keil MDK Holtek Edition](#)
[Keil MDK Holtek Edition \(Free\) Installation Guide](#)

Software Download:

[HT32 Firmware Library](#)
[HT32 Keil Support Package](#)
[HT32 IAR Support Package](#)



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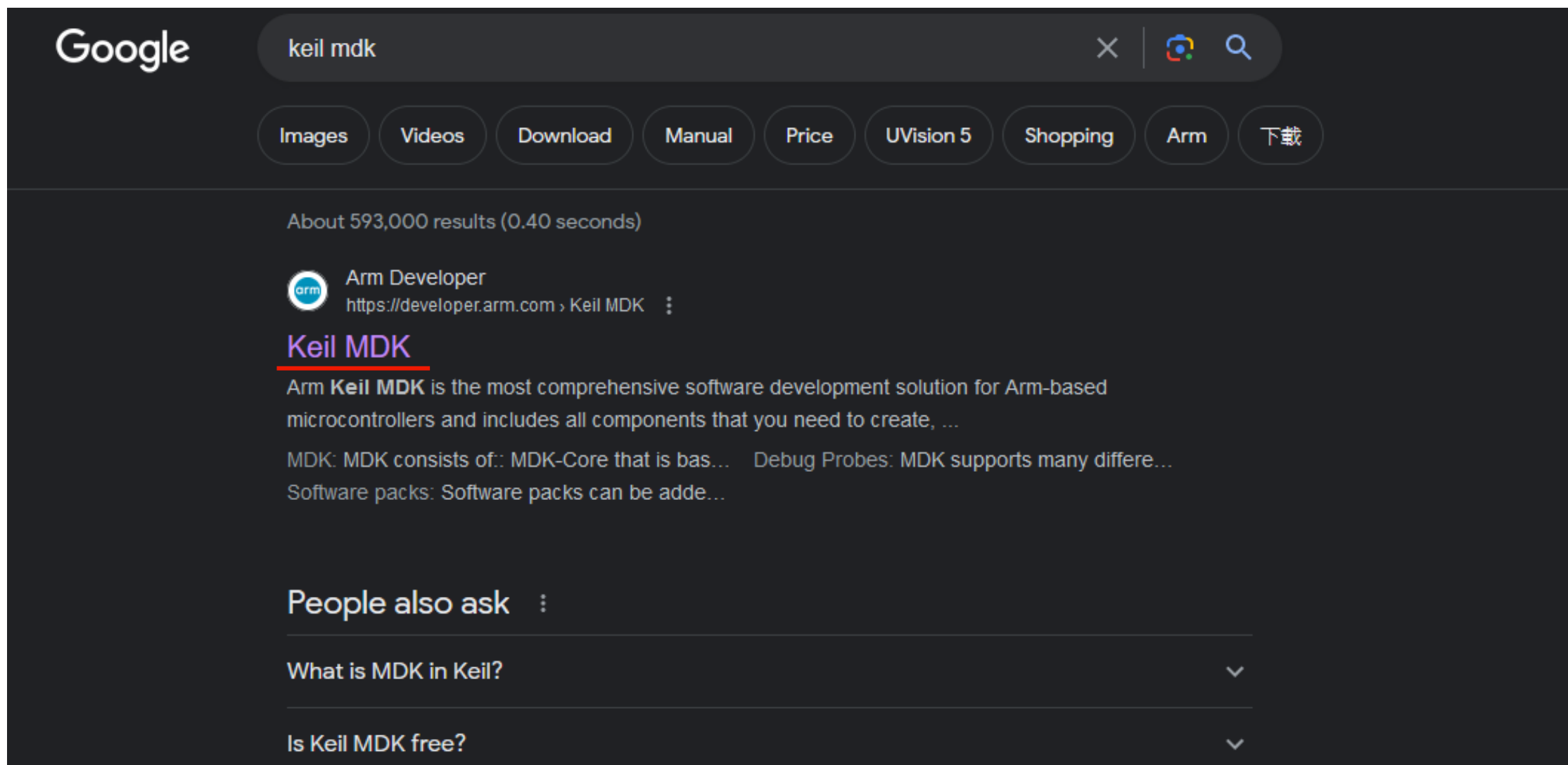
[I Agree](#)

IDE Installation

IDE, Integrated Development Environment

1. Search “Keil MDK”

MDK, Microcontroller Development Kit




The screenshot shows a Google search interface with the query 'keil mdk'. The search bar is at the top, and below it are tabs for Images, Videos, Download, Manual, Price, UVision 5, Shopping, Arm, and 下载. The search results show 'About 593,000 results (0.40 seconds)'. The first result is from 'Arm Developer' with the URL 'https://developer.arm.com › Keil MDK'. The title 'Keil MDK' is underlined. The description states: 'Arm Keil MDK is the most comprehensive software development solution for Arm-based microcontrollers and includes all components that you need to create, ...'. Below this, there are three lines of text: 'MDK: MDK consists of:: MDK-Core that is bas...', 'Debug Probes: MDK supports many differe...', and 'Software packs: Software packs can be adde...'. At the bottom, there is a section titled 'People also ask' with two questions: 'What is MDK in Keil?' and 'Is Keil MDK free?'. Each question has a downward arrow next to it.

Google

keil mdk

Images Videos Download Manual Price UVision 5 Shopping Arm 下载

About 593,000 results (0.40 seconds)

 Arm Developer
<https://developer.arm.com> › Keil MDK

Keil MDK

Arm **Keil MDK** is the most comprehensive software development solution for Arm-based microcontrollers and includes all components that you need to create, ...

MDK: MDK consists of:: MDK-Core that is bas... Debug Probes: MDK supports many differe...

Software packs: Software packs can be adde...

People also ask

What is MDK in Keil?

Is Keil MDK free?

2. Click “Download Keil MDK”

The screenshot shows the ARM Developer website. The header includes the 'arm Developer' logo and links for 'Community' and 'Documentation'. A navigation bar contains 'Developing on Arm', 'Architecture and Processors', and 'Tools and Software'. The main content area is titled 'Keil MDK' and includes a sub-header 'Home / Tools and Software'. Below this is a navigation bar with 'Overview', 'Resources', 'Editions', 'Components', 'Support and Training', and 'Supported Devices'. The 'Key Resources' section lists several links, including 'Keil MDK 5... resources that help you to get started', 'MDK-ARM Cortex-M0/M23 For Nuvoton Only: Unexpected product shown', and 'Keil MDK: Unsupported Compiler - Version 5 or newer required'. At the bottom, there are three buttons: 'Download Keil MDK', 'Buy Keil MDK', and 'Evaluate Keil MDK'. A red arrow points to the 'Download Keil MDK' button. The 'Introduction' section is partially visible at the bottom.

arm Developer

Community Documentation

Developing on Arm Architecture and Processors Tools and Software

Home / Tools and Software

Keil MDK

Overview Resources Editions Components Support and Training Supported Devices

Key Resources

- Keil MDK 5... resources that help you to get started
- MDK-ARM Cortex-M0/M23 For Nuvoton Only: Unexpected product shown
- Keil MDK + User Based License: cached license information has expired
- Keil MDK: Unsupported Compiler - Version 5 or newer required
- Keil MDK Community Edition: Legacy Support?

[View additional resources](#)

[Download Keil MDK](#) [Buy Keil MDK](#) [Evaluate Keil MDK](#)

Introduction

3. Click “Login”

The screenshot shows the Arm Developer website interface. At the top, the 'arm Developer' logo is on the left, and navigation links for 'Community', 'Documentation', 'Downloads', 'IP Explorer', 'Learn', and 'Support and Training' are on the right. Below the logo, a breadcrumb trail reads 'Home / Downloads / Search / Keil MDK (Keil Licensing) (MDK000)'. The main heading is 'Keil MDK (Keil Licensing) (MDK000)' with the subtitle 'Software Development Tools / MDK000'. A navigation bar contains links: 'Home', 'Product Search', 'Recently Viewed', 'Category Tag Classifications', and 'Getting Started'. The main content area features a box with the text 'Log in to view your products' and a blue 'Login' button, which is highlighted by a red arrow. To the right of this box is an 'Important note' section with text about license agreement and security measures. Below the note is a 'Need Help?' section with links to 'Open a support case' and 'Set up Aspera Downloads'. The footer contains six columns of links: 'Developing on Arm' (AI and ML, Automotive, Cloud-to-Edge and Networking, Gaming, Graphics and VR), 'Architecture' (CPU Architecture, System Architectures, Security Architectures, Instruction Sets, Platform Design), 'Products' (CPU Processors, Graphics and Multimedia, Physical IP, System IP, IP Configuration Tools), 'Support' (Design Reviews, Training, Documentation, Licensing, Downloads), 'Community' (Communities, Forums, Blogs), and 'About Arm' (Leadership, Security, News, Contact Us, Arm Offices). A yellow 'Feedback' button is located on the right side of the footer.

arm Developer

Community Documentation Downloads IP Explorer Learn Support and Training

Developing on Arm Architecture and Processors Tools and Software

Home / Downloads / Search / Keil MDK (Keil Licensing) (MDK000)

Keil MDK (Keil Licensing) (MDK000)

Software Development Tools / MDK000

ECCN: 3D991

Log in to view your products

Login

Important note

By downloading, you acknowledge that you will use this product in accordance with all terms and conditions contained in your license agreement with Arm, and in full compliance with all applicable export laws and regulations.

Once downloaded, maintain security measures and processes appropriate to protect Arm's confidential data against anticipated threats and unauthorised access or use.

Need Help?

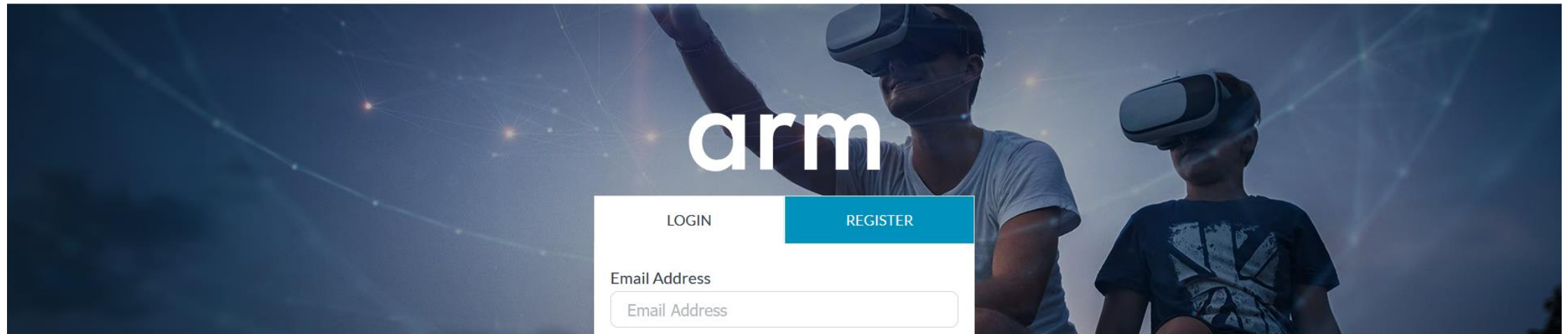
[Open a support case](#)

[Set up Aspera Downloads](#)

Feedback

Developing on Arm	Architecture	Products	Support	Community	About Arm
AI and ML	CPU Architecture	CPU Processors	Design Reviews	Communities	Leadership
Automotive	System Architectures	Graphics and Multimedia	Training	Forums	Security
Cloud-to-Edge and Networking	Security Architectures	Physical IP	Documentation	Blogs	News
Gaming, Graphics and VR	Instruction Sets	System IP	Licensing		Contact Us
	Platform Design	IP Configuration Tools	Downloads		Arm Offices

4. Login or Register



5. Click “Download Now”

armDeveloper

CommunityDocumentationDownloadsIP ExplorerLearnSupport and Training

Developing on ArmArchitecture and ProcessorsTools and Software

Home / Downloads / Search / Keil MDK (Keil Licensing) (MDK000)

Keil MDK (Keil Licensing) (MDK000)

HomeProduct SearchRecently ViewedCategory Tag ClassificationsGetting StartedDownload Queue

Keil MDK (Keil Licensing) (MDK000)

Software Development Tools / MDK000

ECCN: 3D991

Releases

Sort releases by:

Available date

Revision

Select Revision to Download

r5p38-01rel0

Release Name: MDK000-r5p38-01rel0

Release Quality: REL

Available Date: Dec 8, 2022

Keil MDK version 5.38a

Name: MDKCR-BN-00001-r5p38-01rel0

Filename: MDK538a.EXE

MD5: 6792e5e0c0b5207b4db8339e043d7461

Release Notes

887.3 MB

+ Add to queue

Download Now

Important note

By downloading, you acknowledge that you will use this product in accordance with all terms and conditions contained in your license agreement with Arm, and in full compliance with all applicable export laws and regulations.

Once downloaded, maintain security measures and processes appropriate to protect Arm's confidential data against anticipated threats and unauthorised access or use.

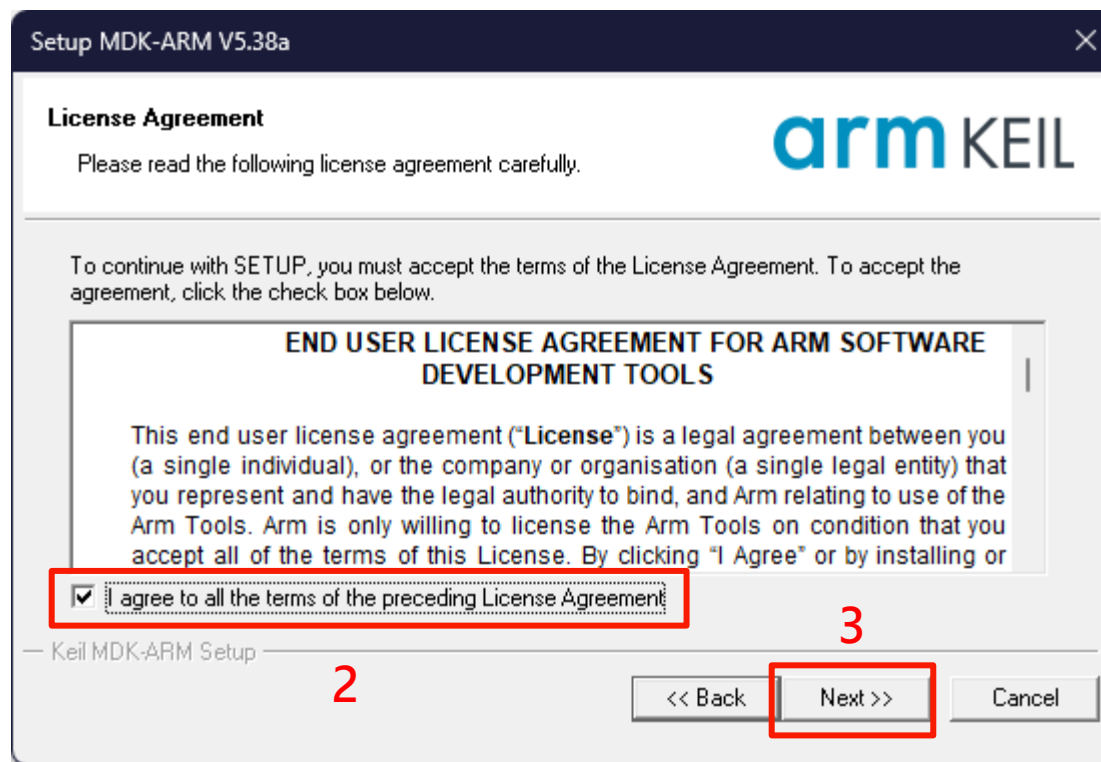
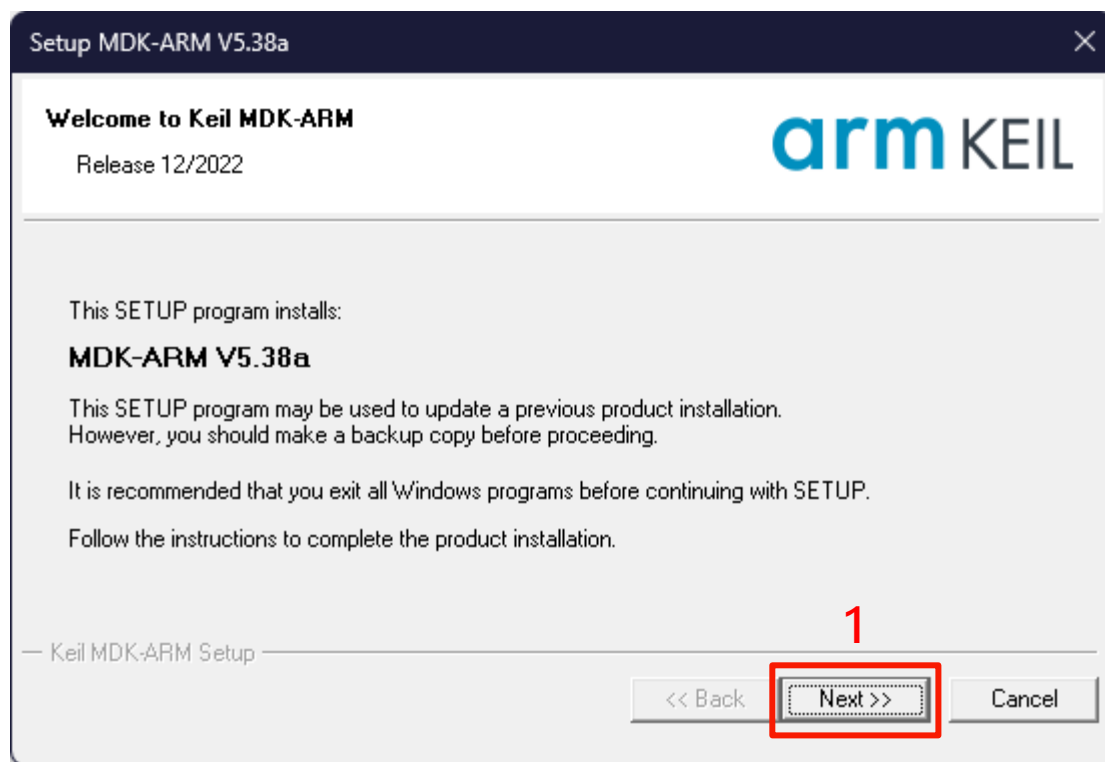
Need Help?

Open a support case

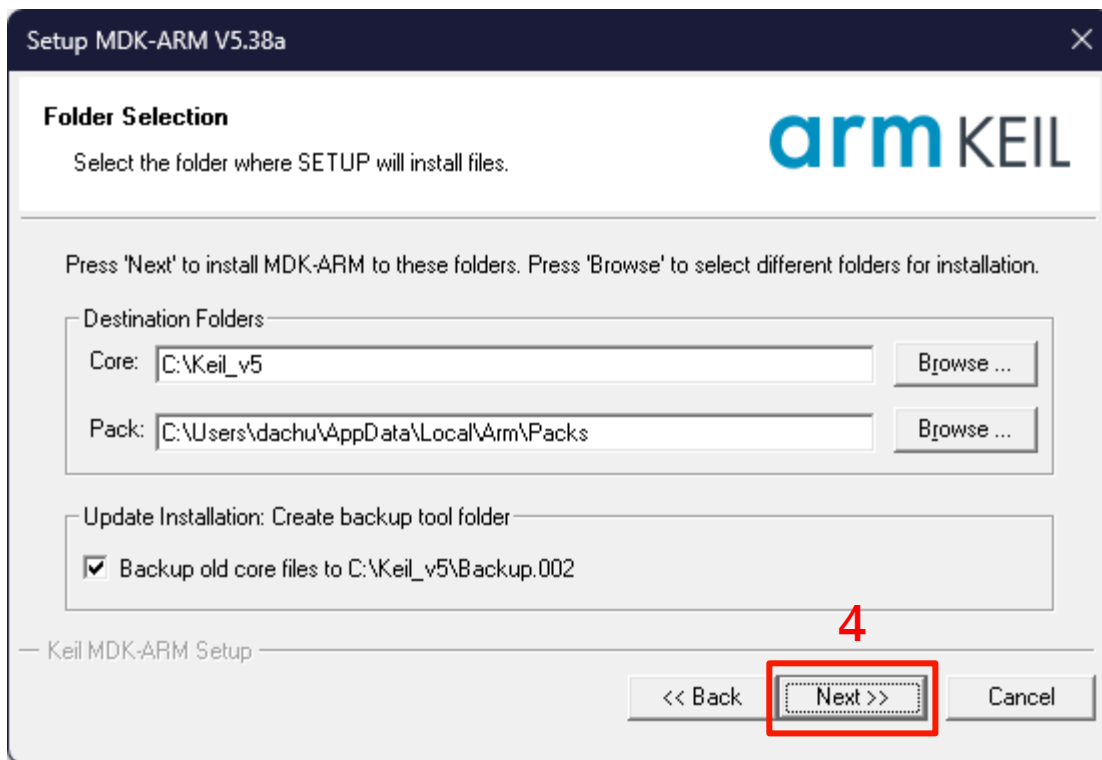
Set up Aspera Downloads

Feedback

6. Execute "MDK538a.EXE"



6. Execute "MDK538a.EXE"



Setup MDK-ARM V5.38a

Folder Selection

Select the folder where SETUP will install files.

Press 'Next' to install MDK-ARM to these folders. Press 'Browse' to select different folders for installation.

Destination Folders

Core: C:\Keil_v5 Browse ...

Pack: C:\Users\dachu\AppData\Local\Arm\Packs Browse ...

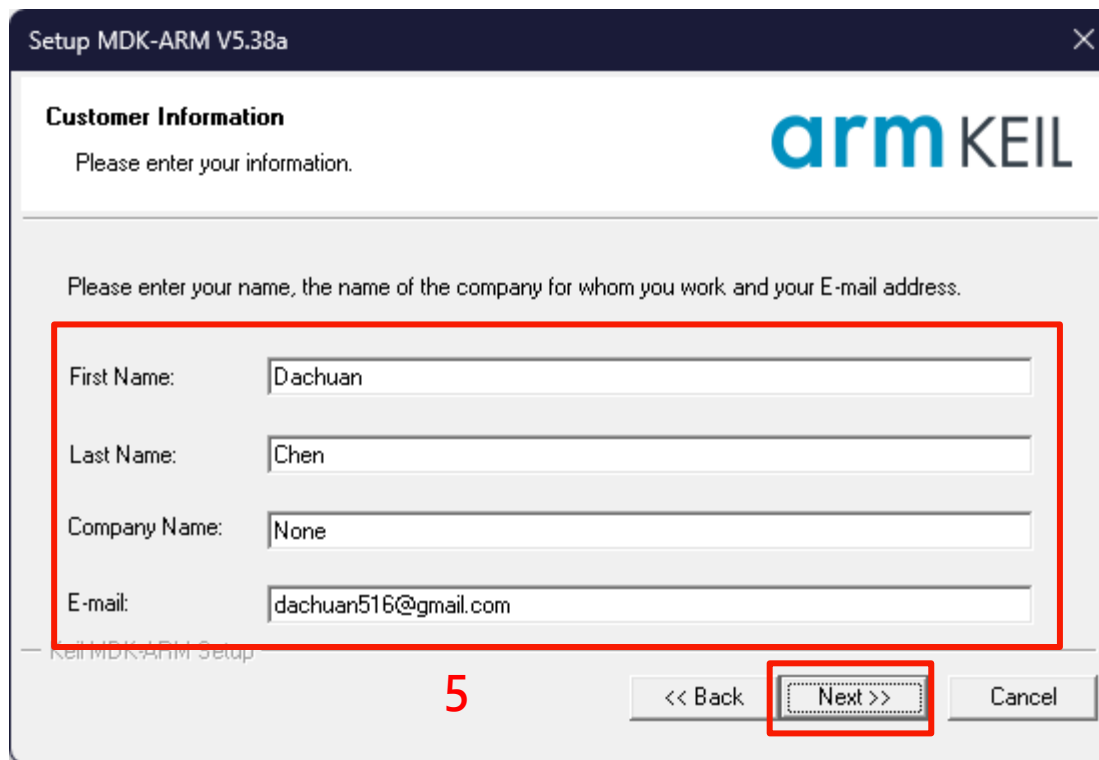
Update Installation: Create backup tool folder

☒ Backup old core files to C:\Keil_v5\Backup.002

Keil MDK-ARM Setup

<< Back **Next >>** Cancel

4



Setup MDK-ARM V5.38a

Customer Information

Please enter your information.

Please enter your name, the name of the company for whom you work and your E-mail address.

First Name: Dachuan

Last Name: Chen

Company Name: None

E-mail: dachuan516@gmail.com

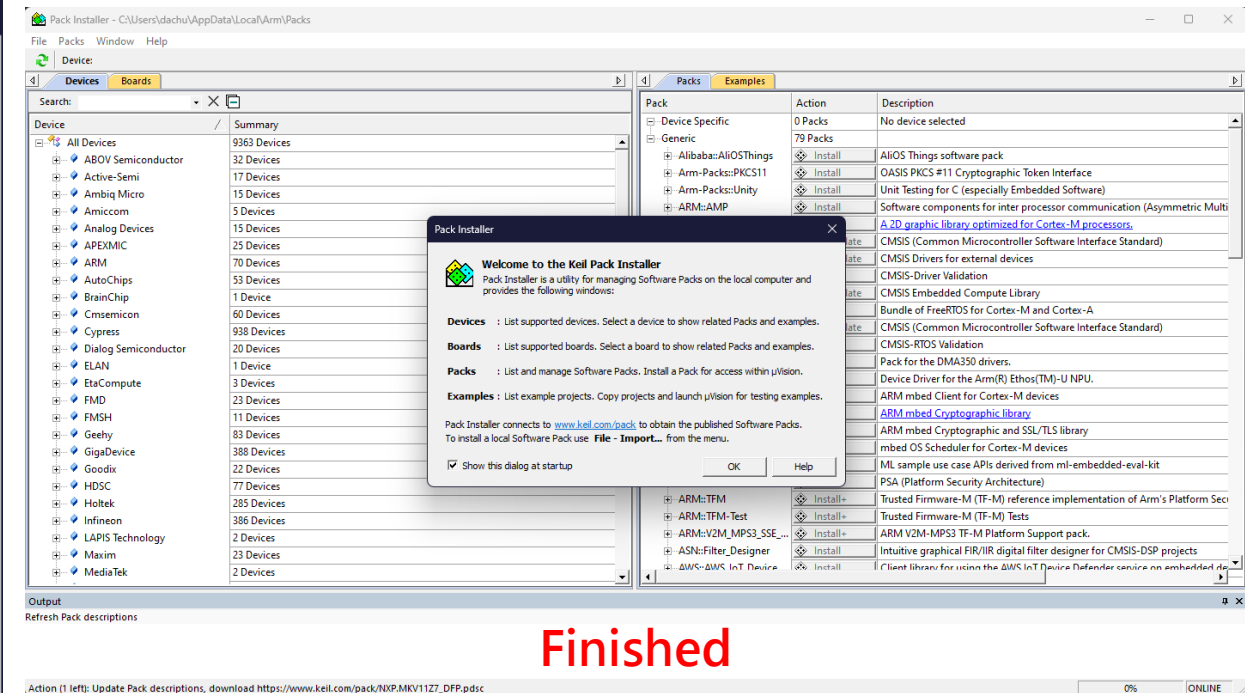
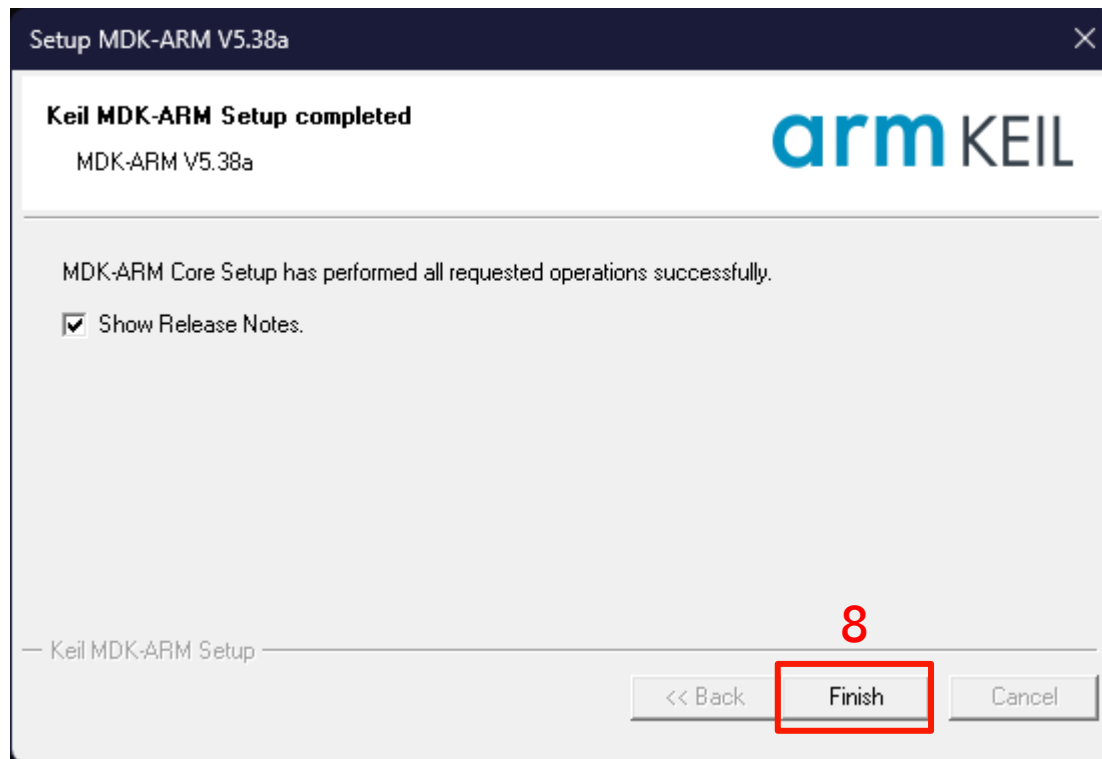
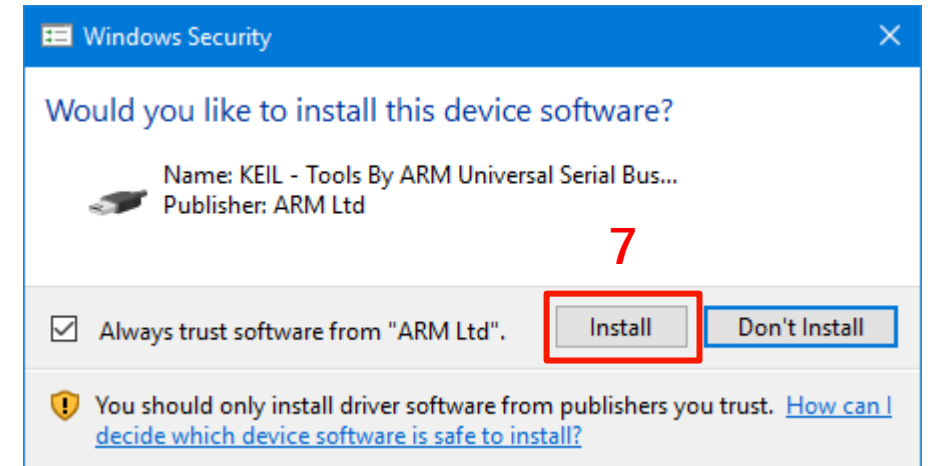
Keil MDK-ARM Setup

<< Back **Next >>** Cancel

5

6

6. Execute "MDK538a.EXE"

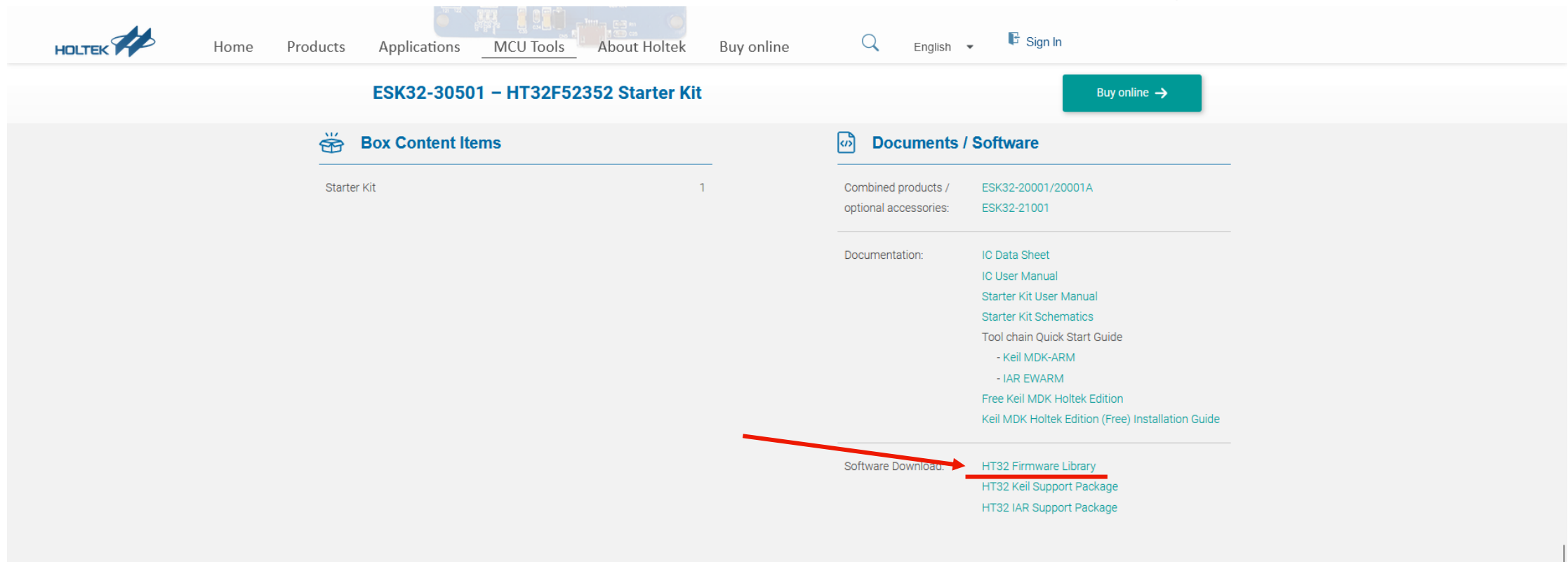


The background features a series of concentric circles in light gray, some solid and some dashed, creating a ripple effect. A bright red callout box with a pointed bottom is centered on the page.

Firmware Library Installation

1. Download “HT32 Firmware Library”

<https://www.holtek.com/esk32-30501>



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ESK32-30501 – HT32F52352 Starter Kit Buy online →

Box Content Items

Starter Kit	1
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Documents / Software

Combined products / optional accessories: [ESK32-20001/20001A](#) [ESK32-21001](#)

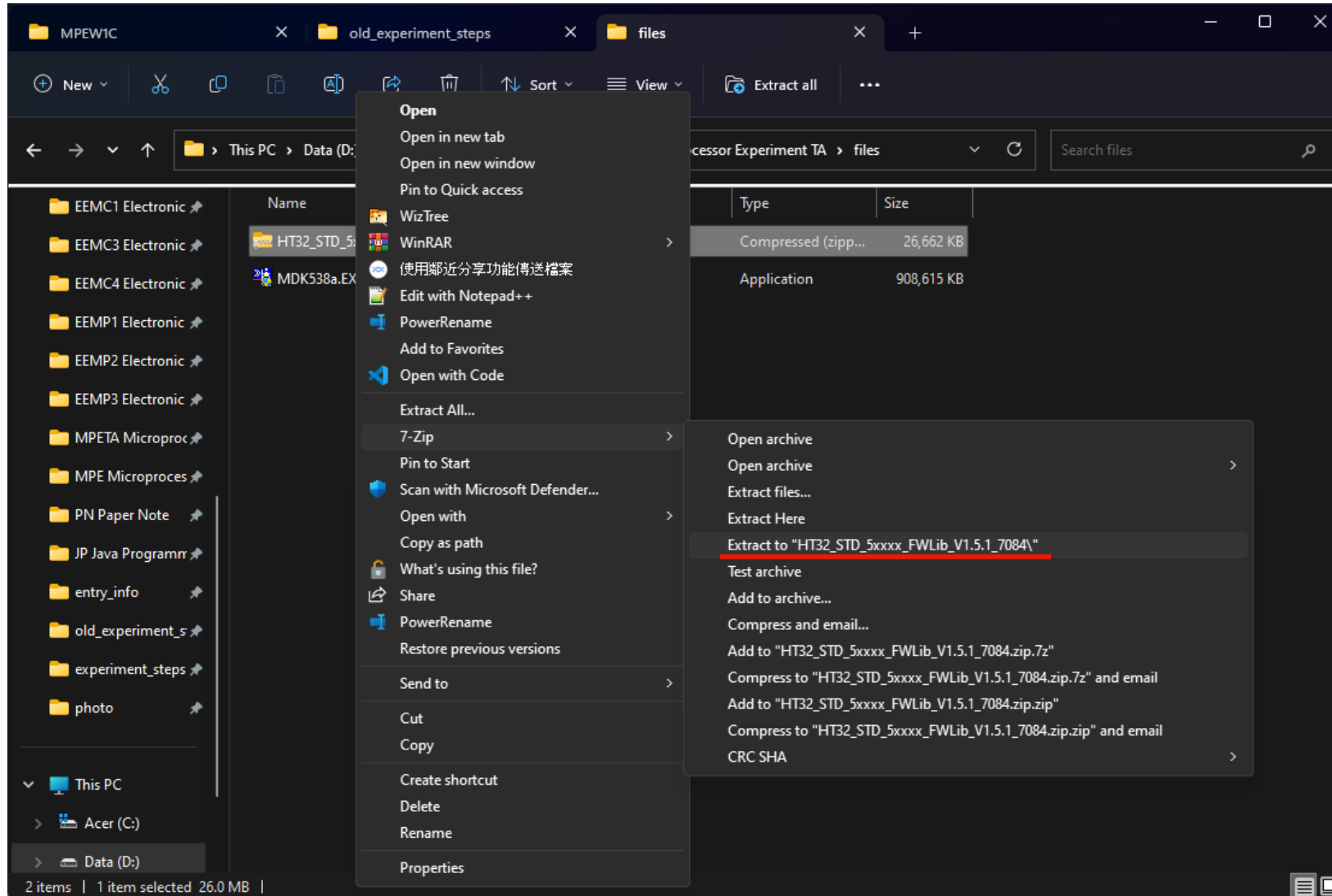
Documentation:

- [IC Data Sheet](#)
- [IC User Manual](#)
- [Starter Kit User Manual](#)
- [Starter Kit Schematics](#)
- [Tool chain Quick Start Guide](#)
 - [- Keil MDK-ARM](#)
 - [- IAR EWARM](#)
- [Free Keil MDK Holtek Edition](#)
- [Keil MDK Holtek Edition \(Free\) Installation Guide](#)

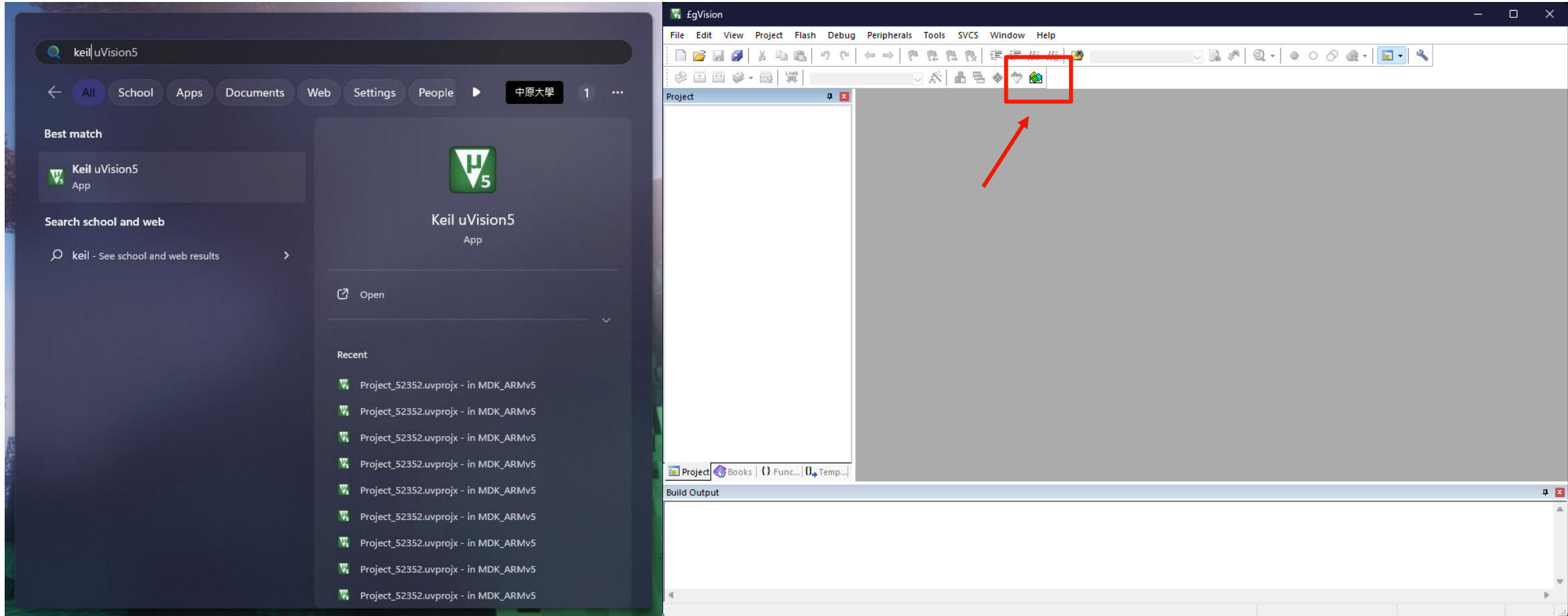
Software Download:

- [HT32 Firmware Library](#)
- [HT32 Keil Support Package](#)
- [HT32 IAR Support Package](#)

2. Extract downloaded ZIP file



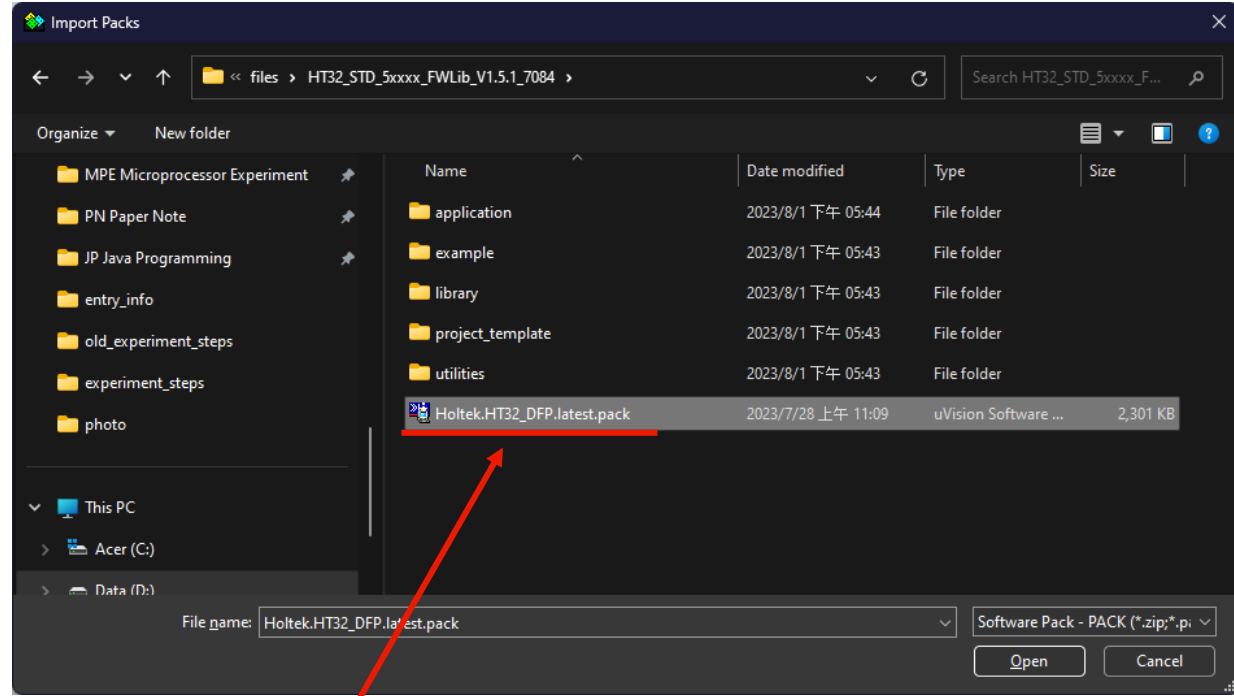
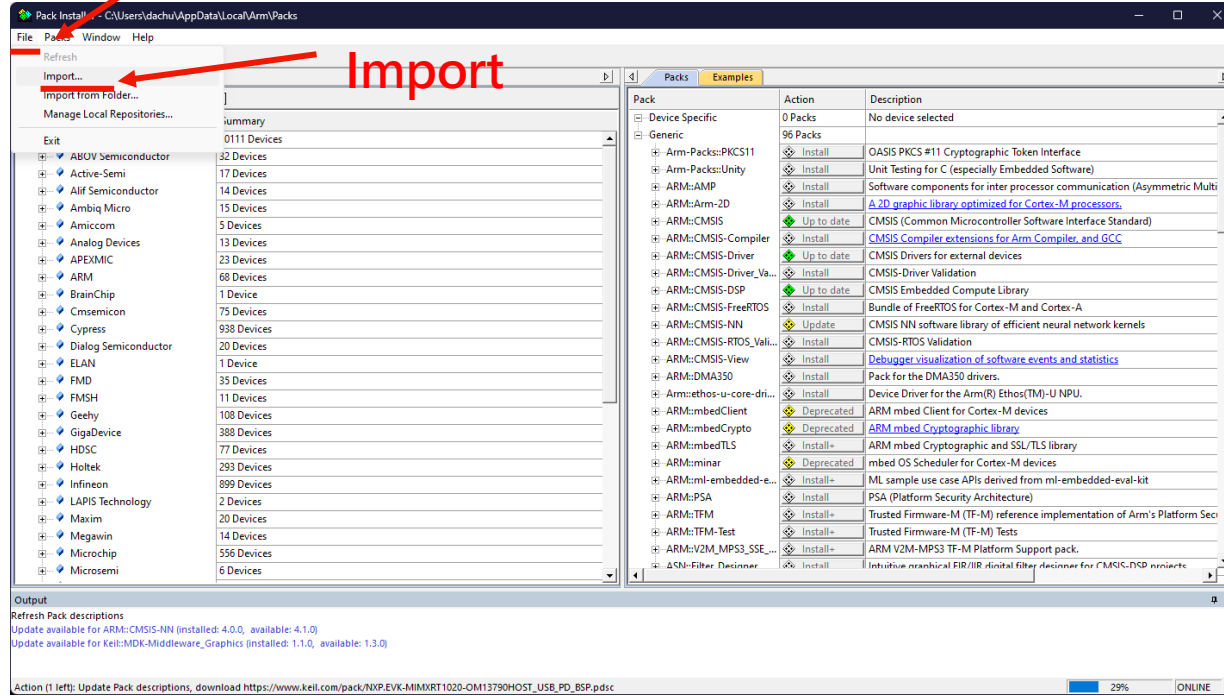
3. Execute “Keil uVision5” and Click “Pack Installer”



4. Import HT32 pack

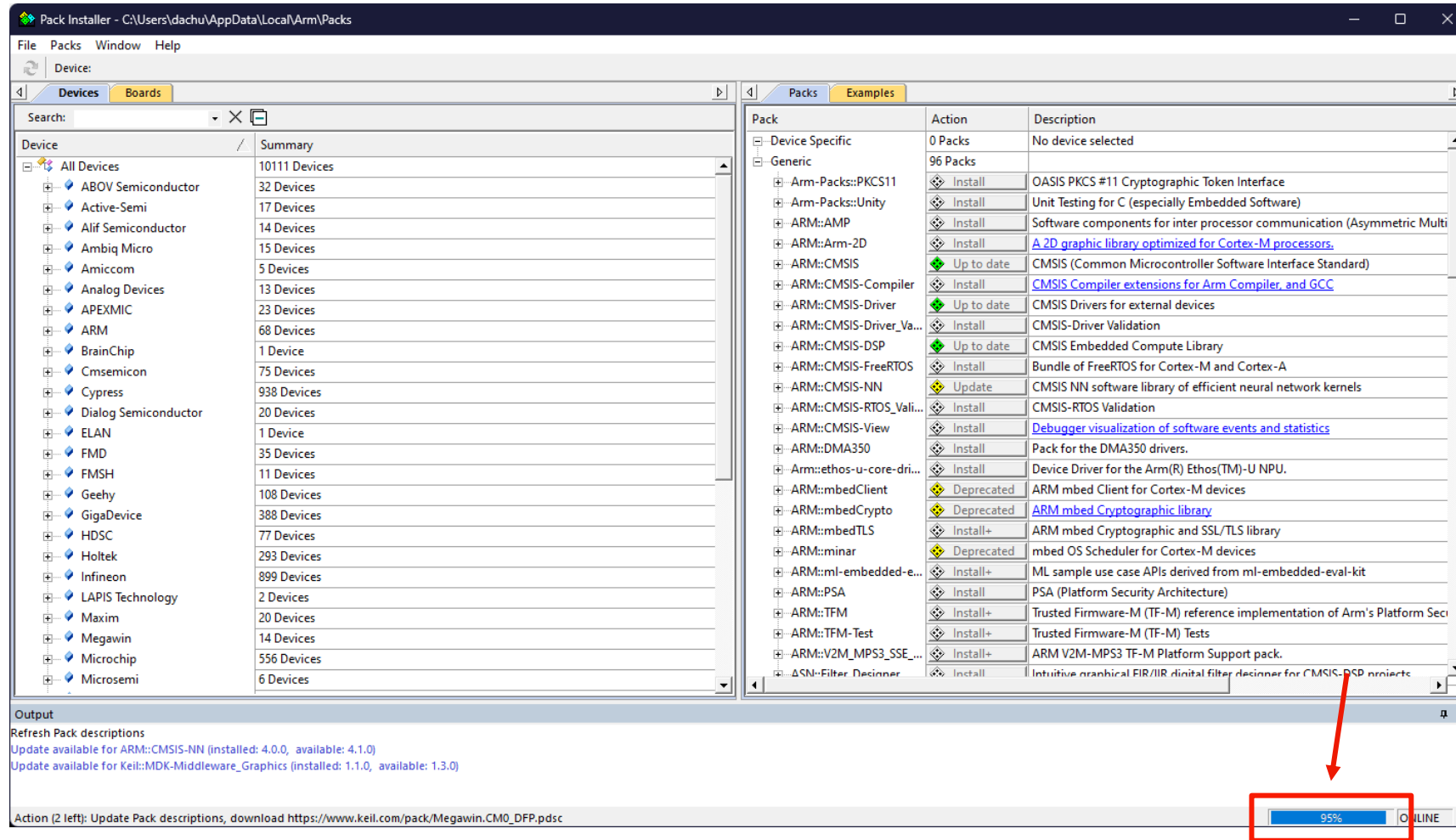
File

Import



~/HT32_STD_5xxxx_FWLib_V1.5.1_7084/Holtek.HT32_DFP.latest.pack

5. Wait till progress is finished. (100%)

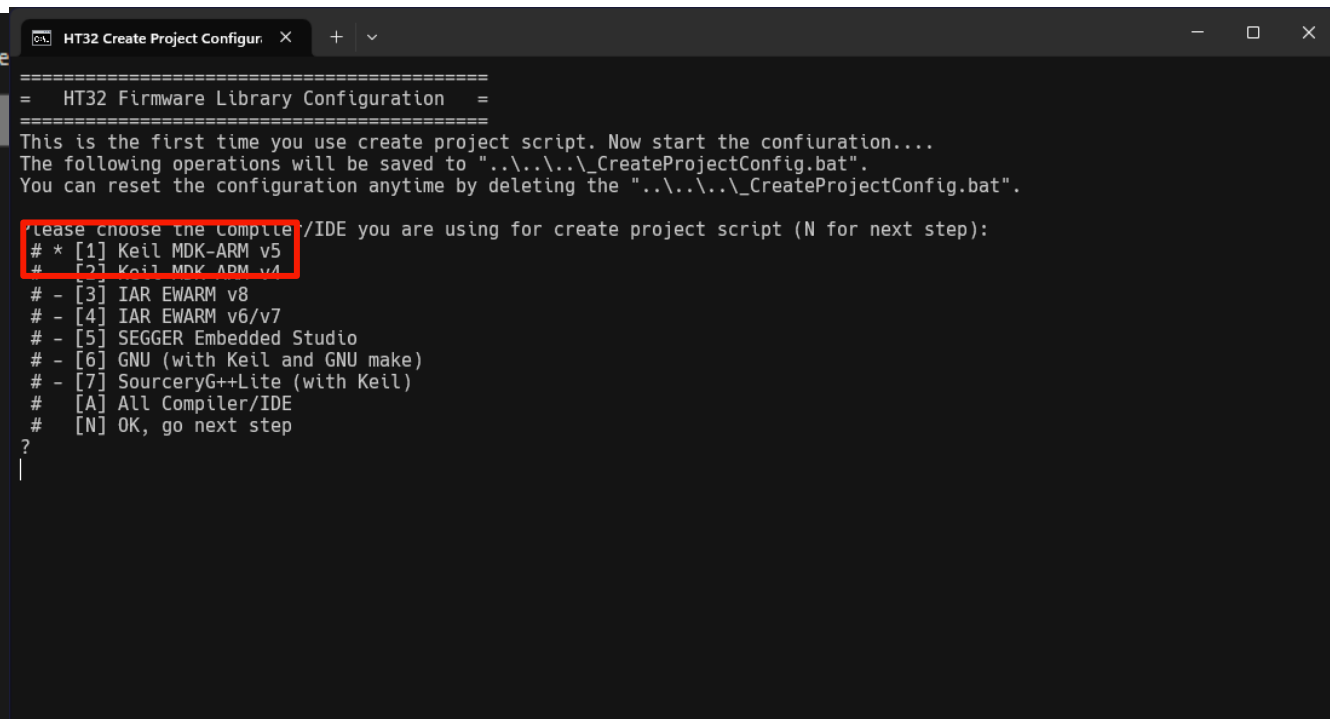
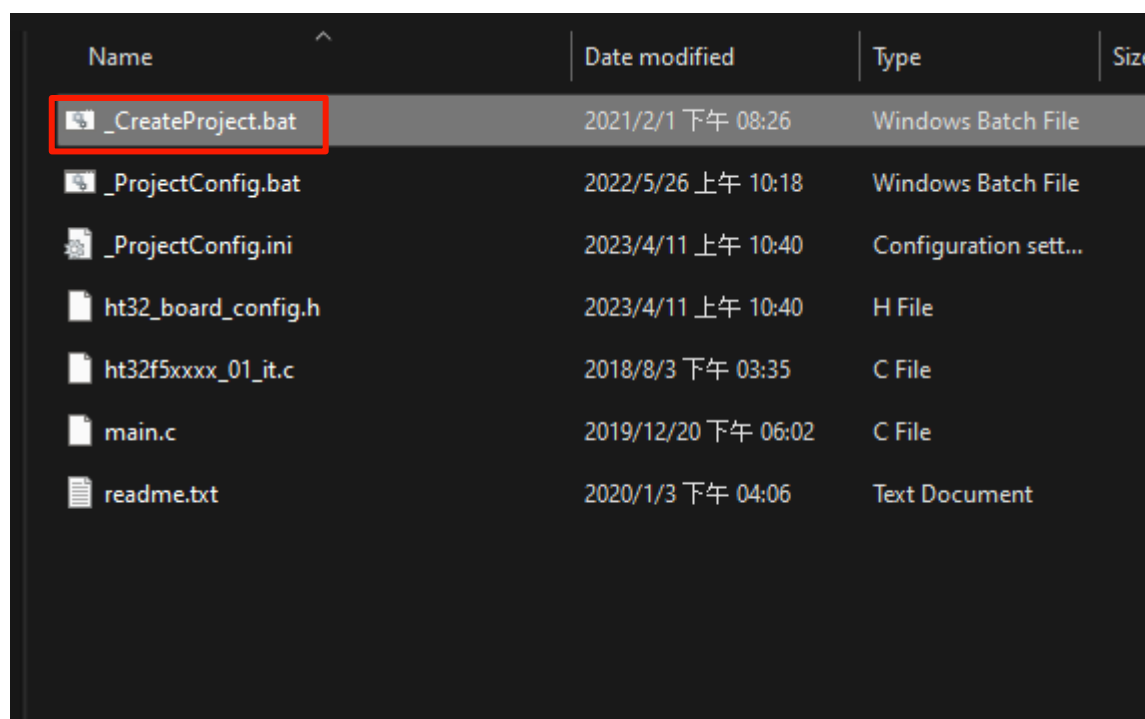


The background features a series of concentric circles in light gray, some solid and some dashed, creating a ripple effect. A bright red callout box is centered, containing the text "Create a New Project".

Create a New
Project

1. Execute "_CreatProject"

1. Go to "~/.HT32_STD_5xxxx_FWLib_V1.5.1_7084/example/CKCU/Clock_Configuration".
2. Double click "_CreateProject.bat".
3. Type "1" and "N" after prompt appears.



2. Type options

```
HT32 Create Project Configur  X  +  v

=====
=  HT32 Firmware Library Configuration  =
=====
This is the first time you use create project script. Now start the confiuration....
The following operations will be saved to "..\..\..\_CreateProjectConfig.bat".
You can reset the confiuration anytime by deleting the "..\..\..\_CreateProjectConfig.bat".

Supported Device List:

- HT32 Series:
- 500*, 502*, 503*, 504*, 522*, 523*, 532*, 542*, 573*, 590*,
- 597*, 611*, 613*, 620*, 652*, 662*, 670*, 677*,

- HT32 Single Device:
- 50030, 50230, 50241, 50343, 52142, 52230, 52241, 52244, 52253, 52341,
- 52352, 52354, 52367, 53a367a, 54241, 54253, 57341, 57352, 59041, 59046,
- 59741, 59746, 61141, 61245, 61352, 61355, 61356, 61357, 61630, 61641,
- 62030, 62040, 62050, 65232, 65240, 66246, 67051, 67232, 67233, 67741,
- 67742, 32002, 32003, 5032, 0006, 0008, 5828, 6306, 3200S, 3200T,
-

Please input the IC name (Example: 52352), "*" for all models:52352]
```

```
HT32 Create Project Configur  X  +  v

- HT32 Single Device:
- 50030, 50230, 50241, 50343, 52142, 52230, 52241, 52244, 52253, 52341,
- 52352, 52354, 52367, 53a367a, 54241, 54253, 57341, 57352, 59041, 59046,
- 59741, 59746, 61141, 61245, 61352, 61355, 61356, 61357, 61630, 61641,
- 62030, 62040, 62050, 65232, 65240, 66246, 67051, 67232, 67233, 67741,
- 67742, 32002, 32003, 5032, 0006, 0008, 5828, 6306, 3200S, 3200T,
-

Please input the IC name (Example: 52352), "*" for all models:52352

Load configuration file, "..\..\..\_CreateProjectConfig.bat" ....
You can reset the create project IDE/IC configuration anytime by deleting the configuration file.

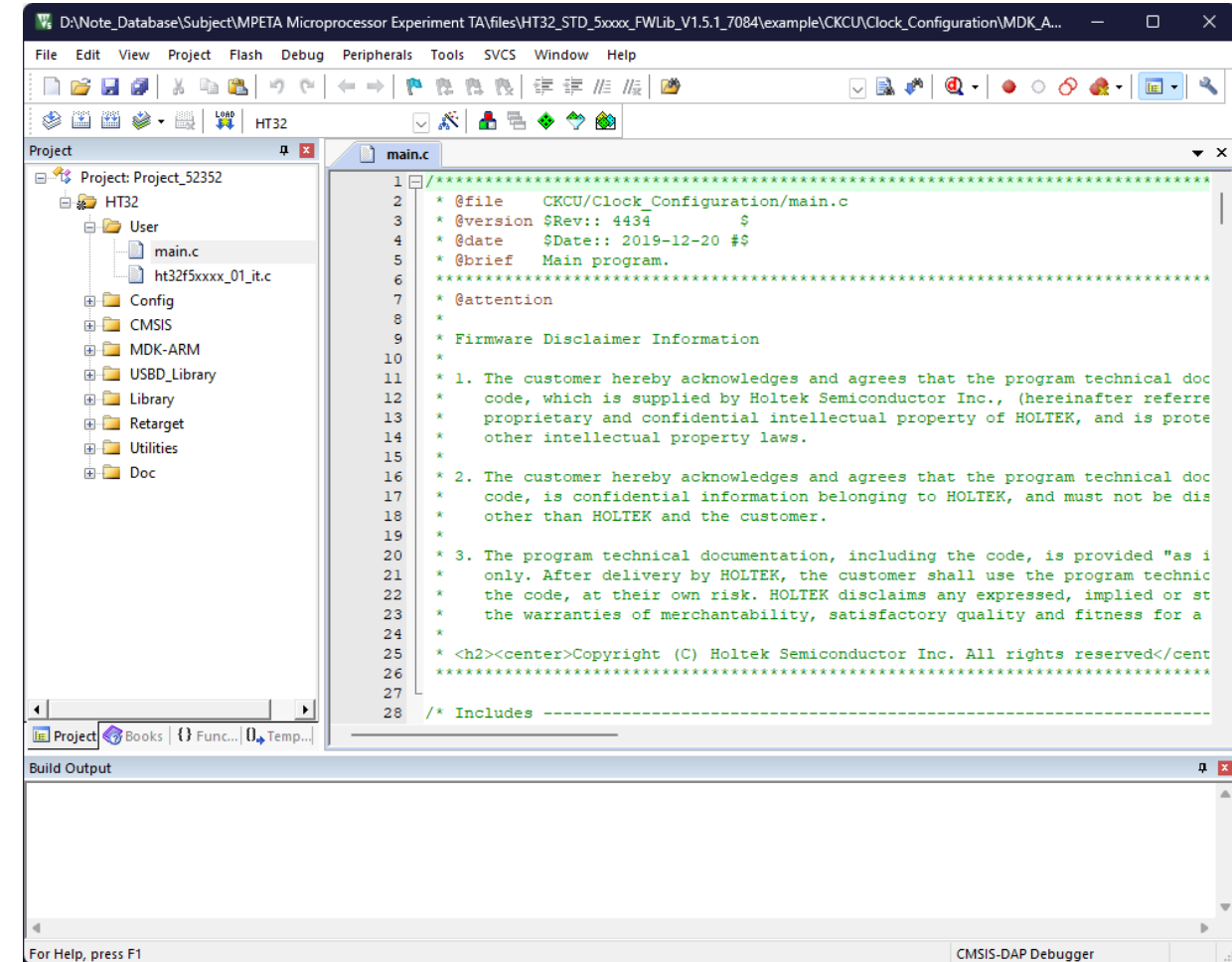
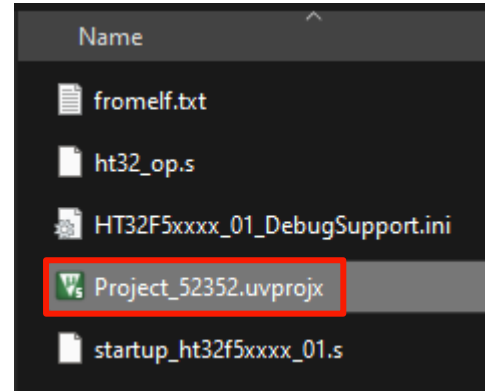
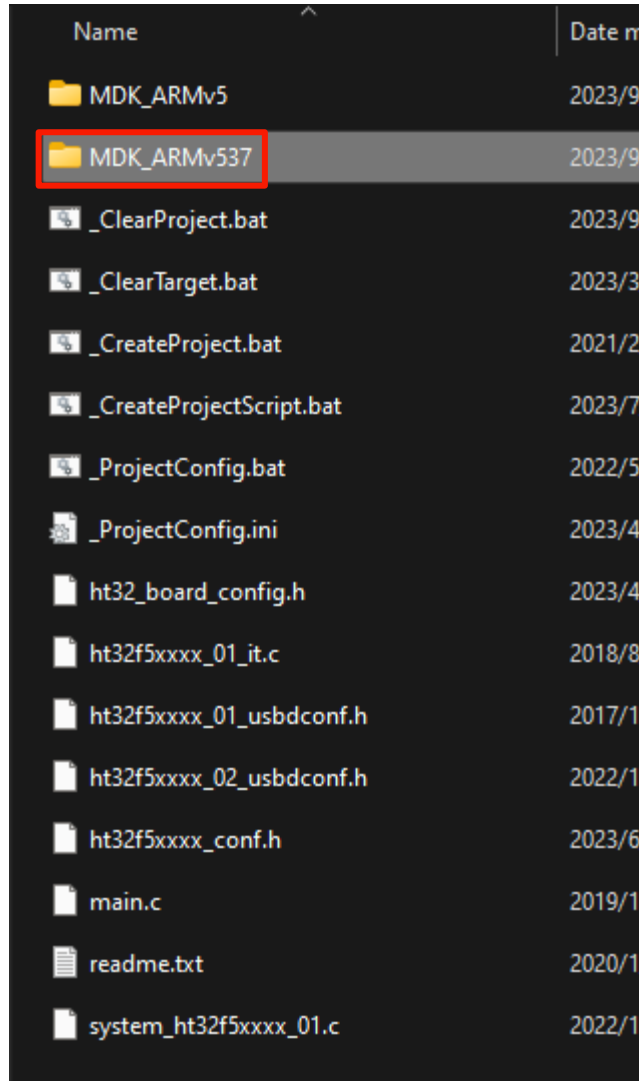
Create Project Setting.:
[Y] Keil MDK-ARM v5
[-] Keil MDK-ARM v4
[-] IAR EWARM v8
[-] IAR EWARM v6/v7
[-] SEGGER Embedded Studio
[-] GNU [with Keil and GNU make]
[-] SourceryG++Lite [with Keil]
Y: Enable, -: Disable

IC Name: 52352 [* for all models, XXX* for series]

Creating project. Please wait....
Success!

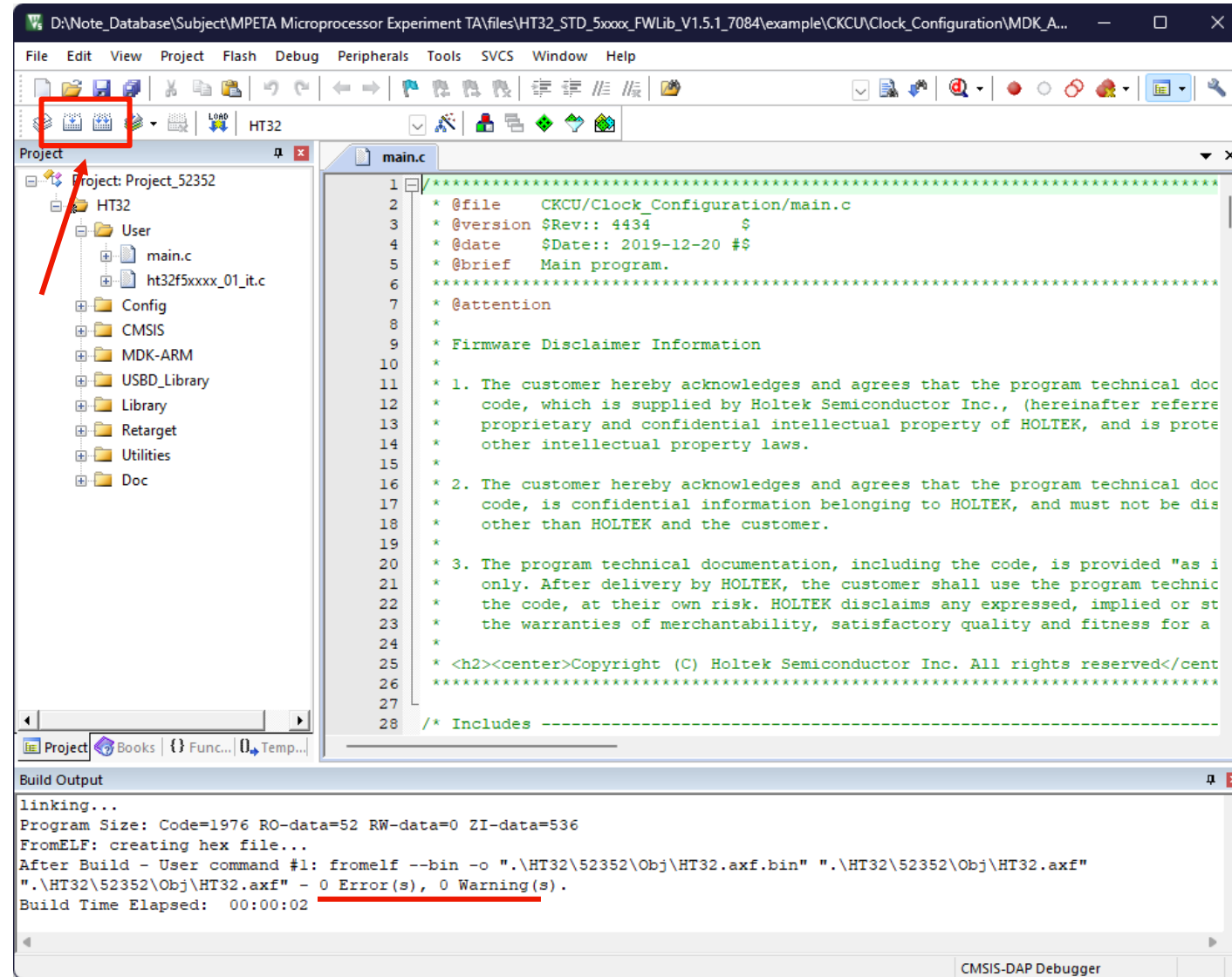
Press any key to continue . . . |
```

3. Launch project



“~/HT32_STD_5xxxx_FWLib_V1.5.1_7084/example/CKCU/Clock_Configuration/MDK_ARMv537/Project_52352.uvprojx”

4. Verify - Compile



The background features a series of concentric circles in light gray, some solid and some dashed, creating a ripple effect. A large red speech bubble is centered on the page, containing the text 'Homework W1-1'.

Homework W1-1

Finish the entire installation process.

A red speech bubble with a white outline and a small tail pointing downwards. Inside the bubble, the text "Class Dismissed" is written in white, sans-serif font. The bubble is positioned on the left side of the slide, overlapping a background of faint, curved, light gray lines.

Class
Dismissed