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**Keil® MDK Holtek Edition (Free)**  
**Installation Guide**

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**[www.holtek.com](http://www.holtek.com)**

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## 1. Introduction

The purpose of this installation guide is to familiarise users with the Keil® MDK Microcontroller Development Kit, provide installation information and how to obtain a free serial number. The Keil MDK can be applied to the Holtek Arm® Cortex-M0+ series MCUs and its V5.28 or later versions which are free for use without code size restrictions. In addition to the free versions, the Keil MDK also offers a low-cost version for the Holtek Arm Cortex-M3/M4 series products which can be purchased from Arm's online store.

The guide includes three parts: Installation Requirements, Installation Process and Environment Confirmation. More detailed information is available at the following website.

M0+ version download website: <http://www2.keil.com/holtek/ht-edition>. Free serial numbers and more information are available.

M3/M4 version purchase website: <https://www2.keil.com/holtek/edition>

MDK licensing website: <https://developer.arm.com/support>

## 2. Installation Requirements

- Download the Keil MDK-ARM V5.28 or later version software
- Download and install the HT32 USB Virtual COM driver
- Download the HT32 Standard Peripheral Firmware Library

### Download the Keil MDK-ARM Software

The Keil MDK-ARM software can be downloaded from <http://www.keil.com>. Note that the evaluation version has a limitation on its 32 KB of code size. The following steps show how to download the Keil MDK-ARM software.

Step 1: Press the “Download MDK Core” button on the <http://www2.keil.com/holtek/ht-edition> website, the following screen will appear.

Step 2: Fill in the information in the window.

Step 3: Press the “Submit” button.

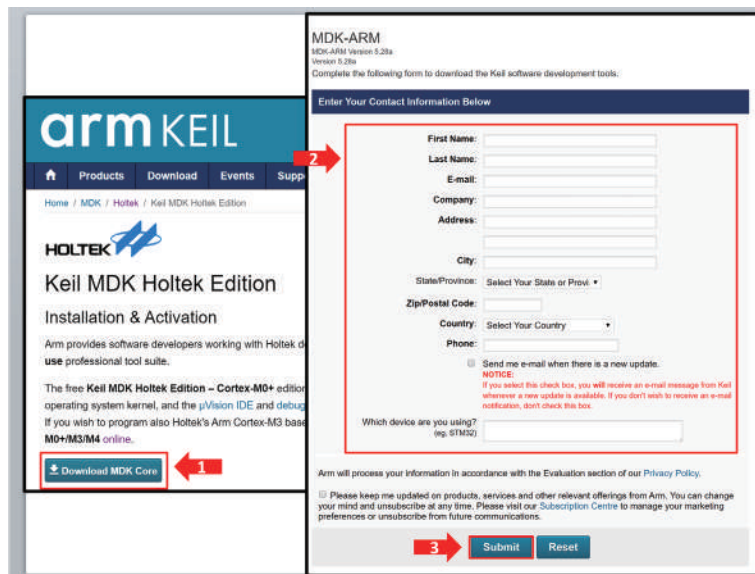


Figure 1. Keil MDK-ARM Download

Step 4: Click the installation file download link as shown in the following figure. Refer to the “Installation Process” section for the installation steps.


**MDK-ARM**  
MDK-ARM Version 5.28a  
Version 5.28a

- Review the [hardware requirements](#) before installing this software.
- Note the [limitations of the evaluation tools](#).
- [Further installation instructions for MDK5](#)

(MD5:E2FD386C3E8F6E1095879C069CBAA713)

To install the MDK-ARM Software...

- Right-click on **MDK528A.EXE** and save it to your computer.
- PDF files may be opened with Acrobat Reader.
- ZIP files may be opened with PKZIP or WINZIP.



**MDK528A.EXE** (818.557K)  
Tuesday, June 4, 2019

- If you are evaluating the tools, be sure to [request a quote](#) for the full version of the tools.

**Figure 2. Keil MDK-ARM Installation File Download**

## Download and Install the HT32 Virtual COM Driver

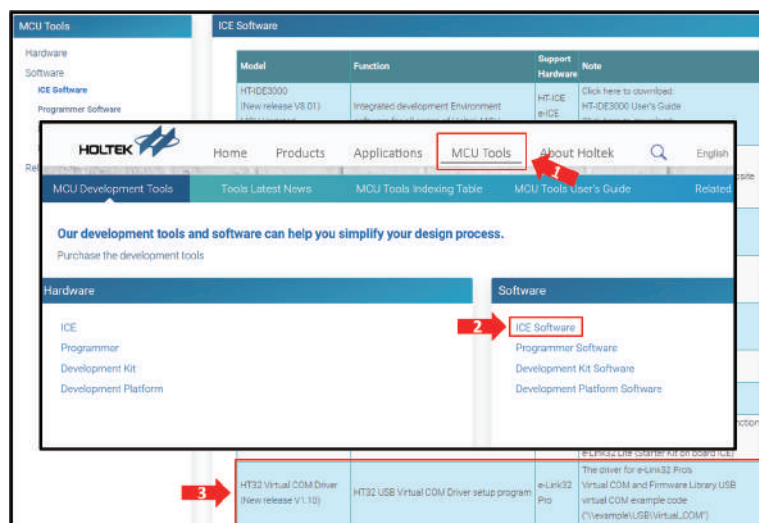
To implement the environment debugging after the installation process is complete, install the HT32 USB Virtual COM driver first. Transfer the data through the Virtual COM together with the Firmware Library example during the debugging process to determine whether the environment is normal or not.

The following steps shows how to obtain and install the HT32 USB Virtual COM driver:

Step 1: Open the Holtek website and press the “MCU Tools” button at the top.

Step 2: Press the “ICE Software” button under the software category on the right corner.

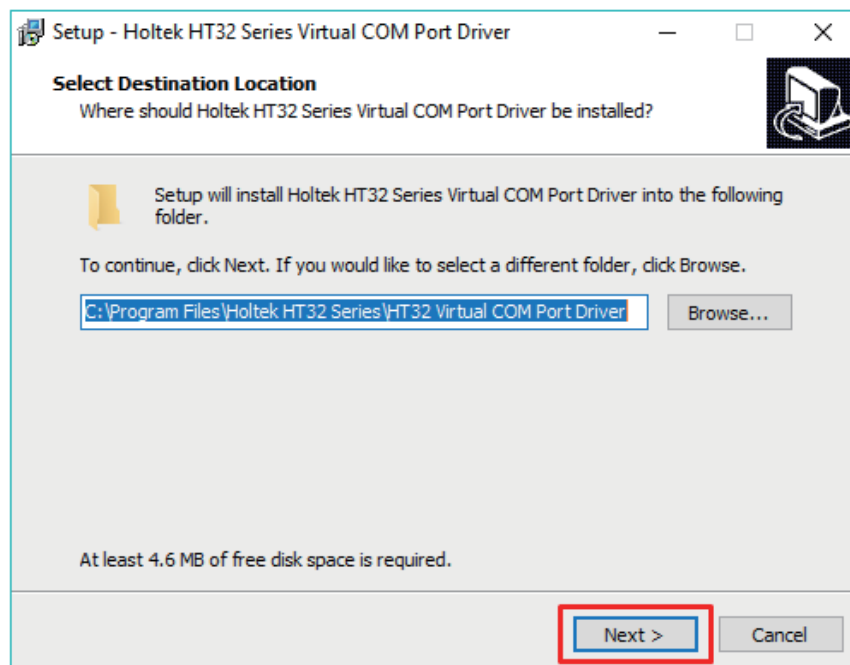
Step 3: Download the “HT32 Virtual COM Driver” with the filename “HT32\_VCP\_Driver\_vnnn.exe”, where “nnn” represents the version number.



**Figure 3. HT32 Virtual COM Drive Obtain – Download Path**

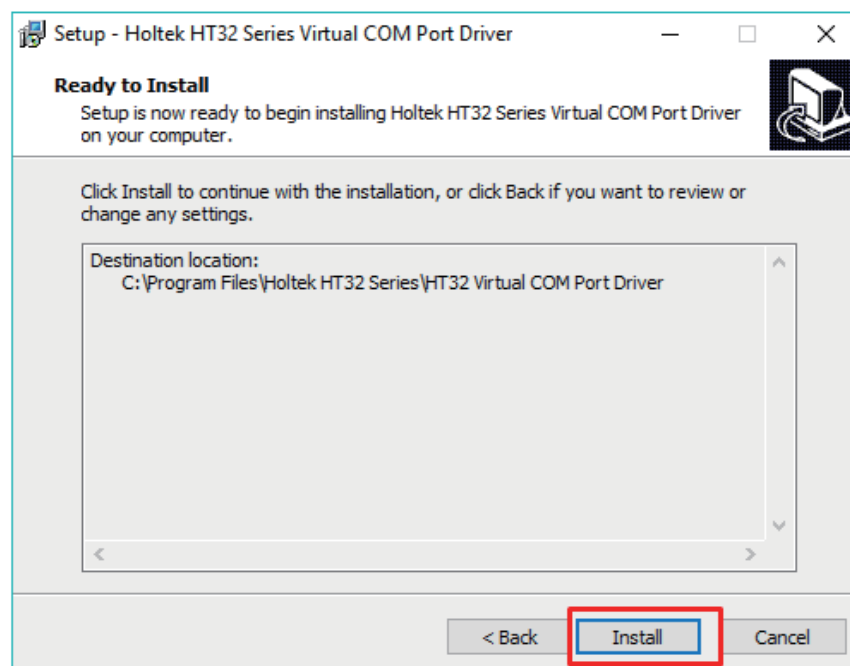
Step 4: Execute the installation program by double-clicking on “HT32\_VCP\_Driver\_vnnn.exe”.

Step 5: Press the “Next” button to continue when the screen below appears.



**Figure 4. HT32 Virtual COM Drive Installation – Destination Path**

Step 6: After the target path has been confirmed, the “Ready to install” screen will appear. Press the “Install” button to start the installation.



**Figure 5. HT32 Virtual COM Drive Installation – Installation Confirmation**

Step 7: After the installation has completed, a completion screen will appear. Press the “Finish” button to exit the installation program.

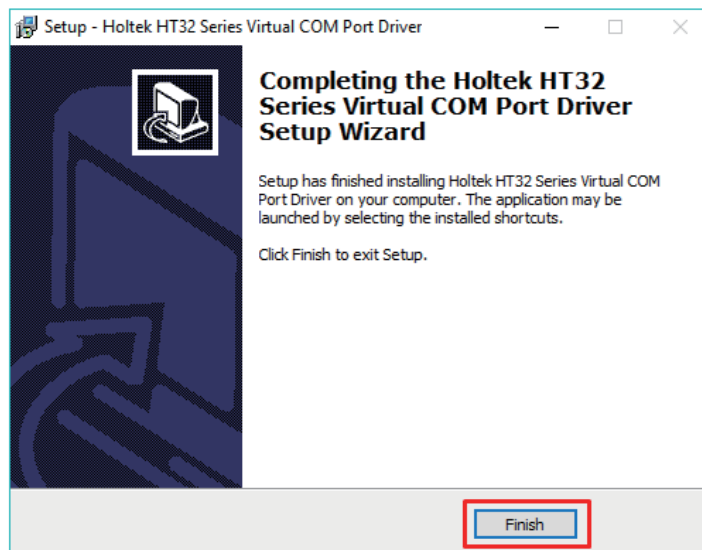


Figure 6. HT32 Virtual COM Drive Installation – Completion

## Download HT32 Standard Peripheral Firmware Library

It is recommended to use a firmware library for development. The following steps show how to obtain a firmware library:

Step 1: Open the Holtek website and press the “MCU Tools” button at the website top.

Step 2: Click the “Development Kit Software” under the “Software” category on the right corner.

Step 3: Download the M0+ firmware library with the filename “HT32\_STD\_5xxxx\_FWLib\_vnnn\_yyyy”, where “nnn” represents the version number. In addition, if the M3 series are used, users need to select the M3 firmware library with the filename “HT32\_STD\_1xxxx\_FWLib\_Vnnn\_yyyy”.

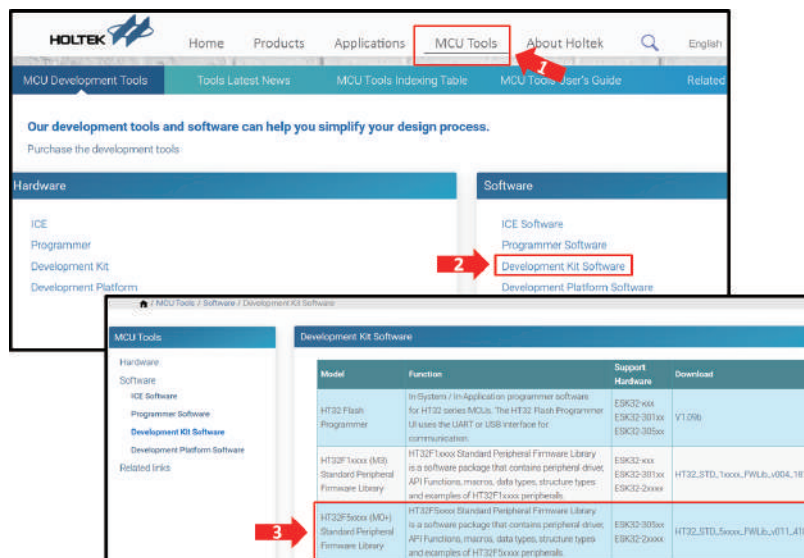


Figure 7. Firmware Library Download Path


### 3. Installation Process

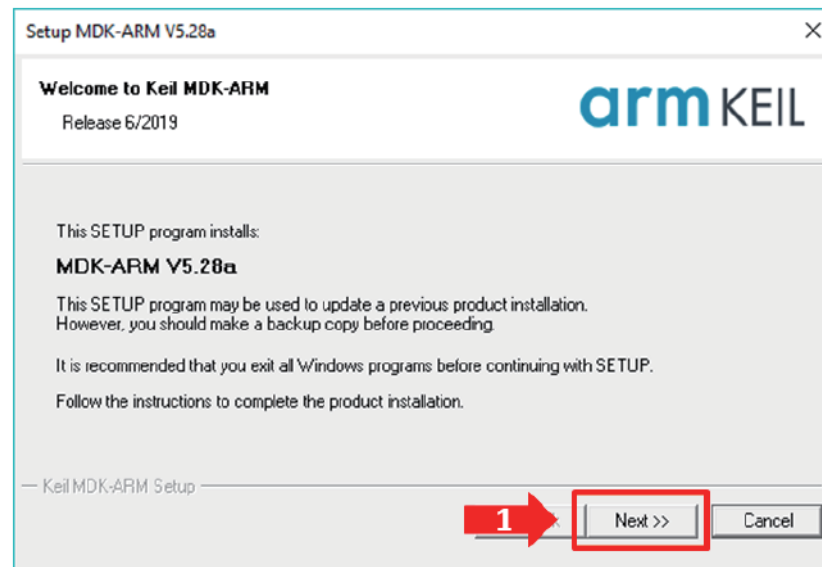
The following three steps should be used to implement the free version.

- Keil MDK-ARM installation
- Apply for the Holtek Licenses
- Activate the Holtek Licenses

#### Keil MDK-ARM Installation

The Keil MDK-ARM installation steps are shown as follows.

Step 1: Double-click on the MDK installation file with the  icon. The filename is the “mdknnn.exe”, where “nnn” represents the version number and then press the “Next” button to continue.



**Figure 8. Keil MDK-ARM Installation**

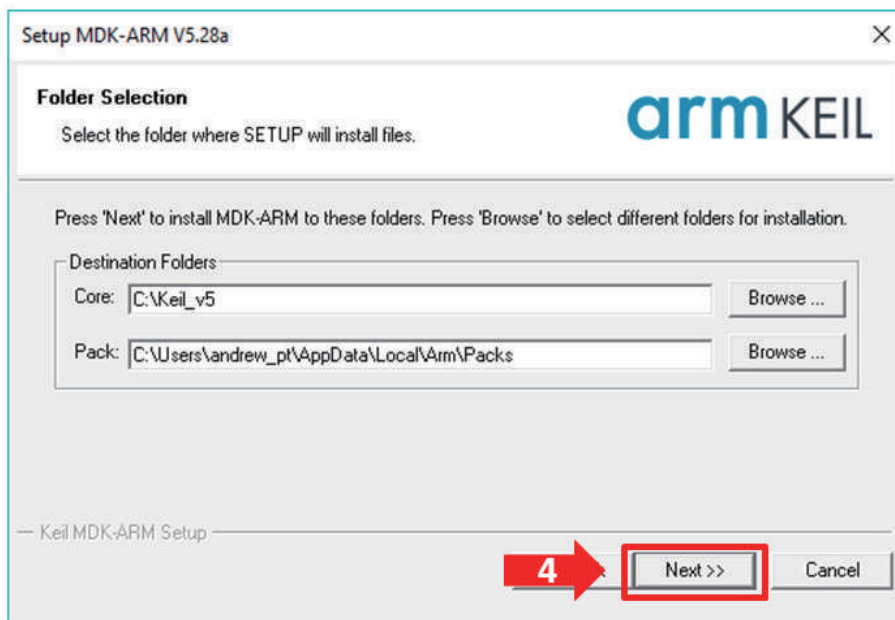
Step 2: Confirm the agreement by selecting “I agree to all the terms of the preceding License Agreement”.

Step 3: Press the “Next” button to continue.



**Figure 9. Keil MDK-ARM Installation – License Agreement Confirmation**

Step 4: Confirm the installation path and press the “Next” button to continue.



**Figure 10. Keil MDK-ARM Installation – Destination Installation Path**

Step 5: Fill in the personal information.



Step 6: Press the “Next” button to continue.

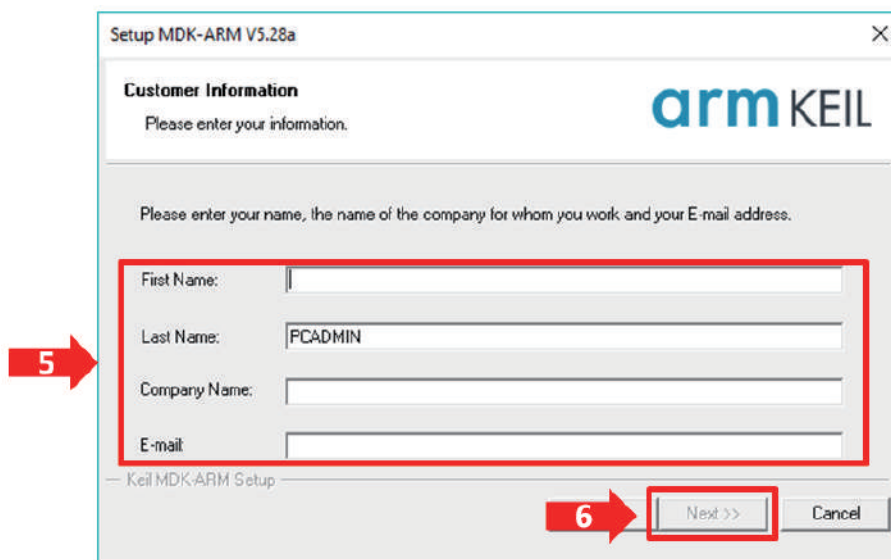


Figure 11. Keil MDK-ARM Installation – Personal Information

Step 7: Press the “Finish” button to exit the installation program when the installation setups are finished.

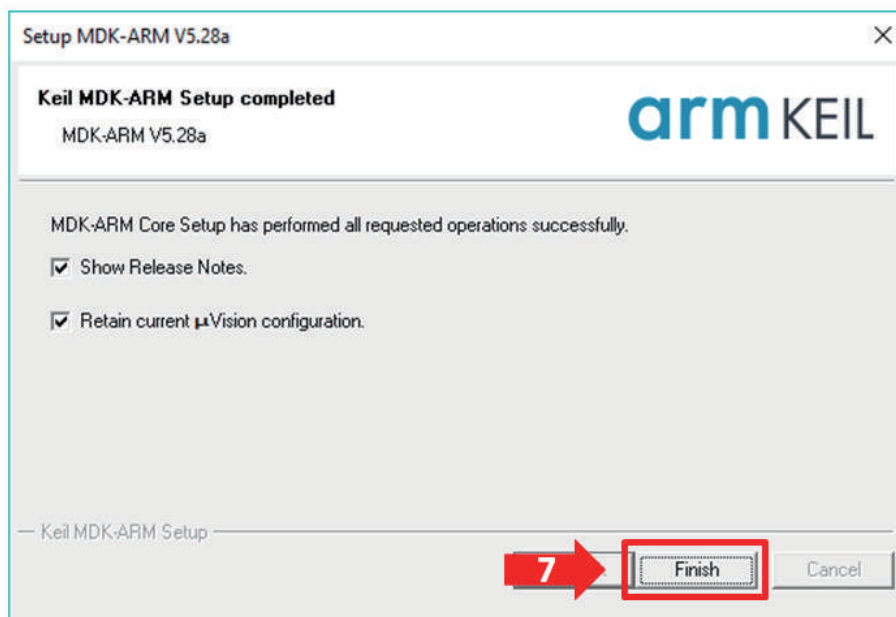


Figure 12. Keil MDK-ARM Installation – Completion

## Apply for the Holtek Licenses

The following are the steps to apply for the Holtek Licenses.

Step 1: Click the <http://www2.keil.com/holtek/ht-edition> and then enter a desired email address in the highlighted box.

Step 2: Press the “Submit” button to apply for a serial number.

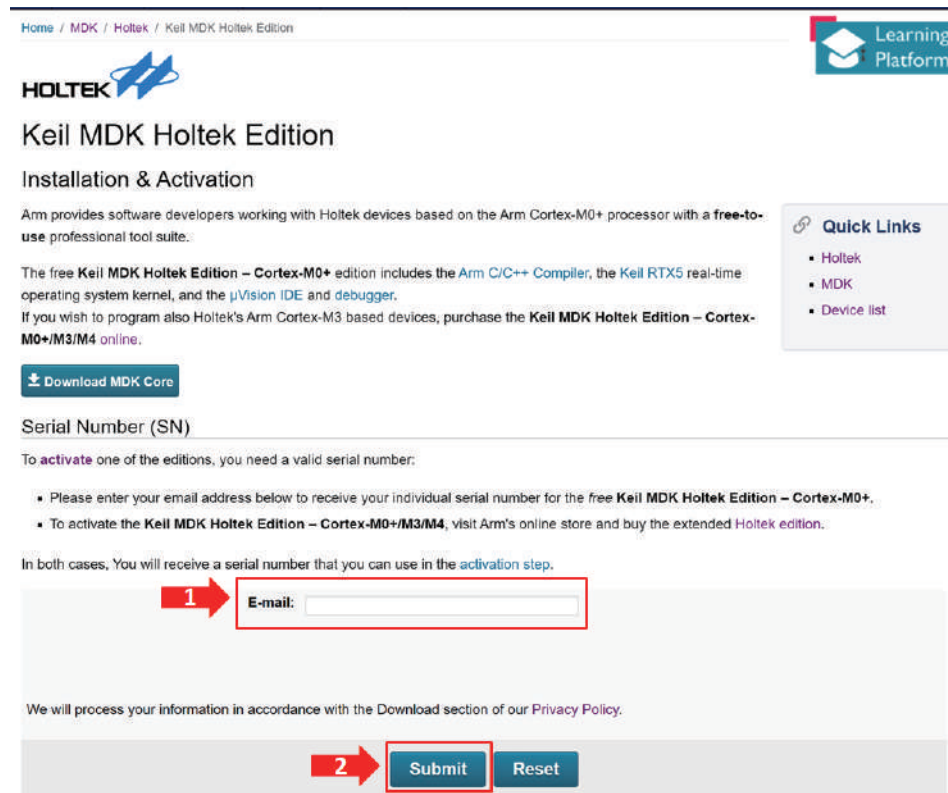


Figure 13. Apply for the Holtek Licenses – Serial Number Application

Step 3: A serial number will be sent to the email address that was supplied.

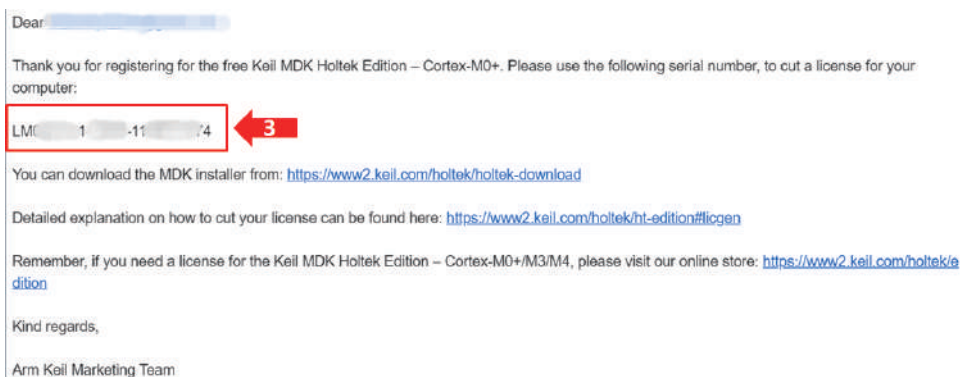


Figure 14. Apply for the Holtek Licenses – Personal E-mail Serial Number Mail

Step 4: On the <https://developer.arm.com/> website, click the top right icon to login/register an arm developer account.

Step 5: Fill in the personal information and press the “Log in” button.

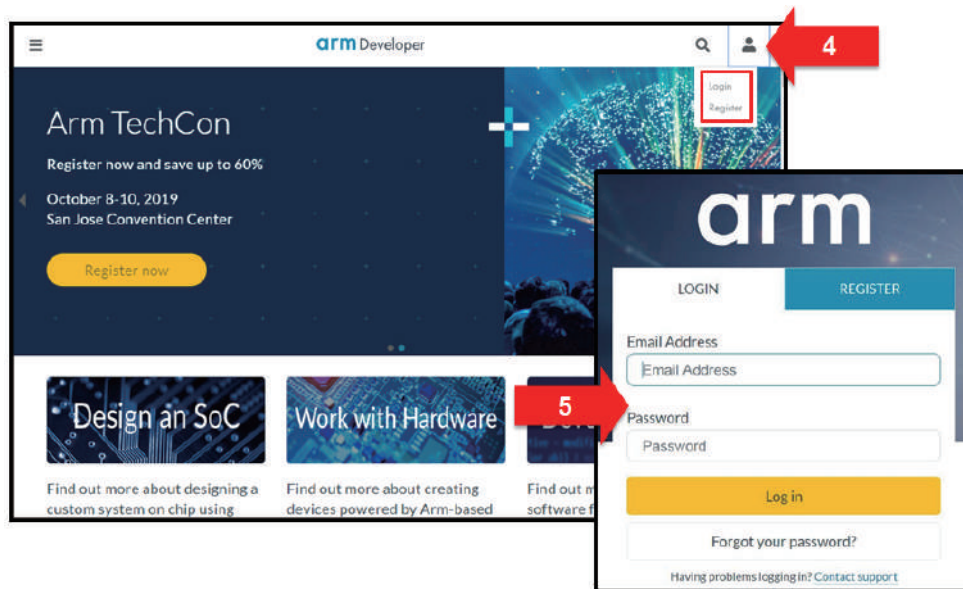


Figure 15. Apply for the Holtek Licenses – Login Personal Account

Step 6 ~ Step 8: Click the ☰ icon at the top left and then click the “Tools and Software” and “Licensing” in order to enter the right screen.

Step 9: Press the “Generate” button to generate a secret key.

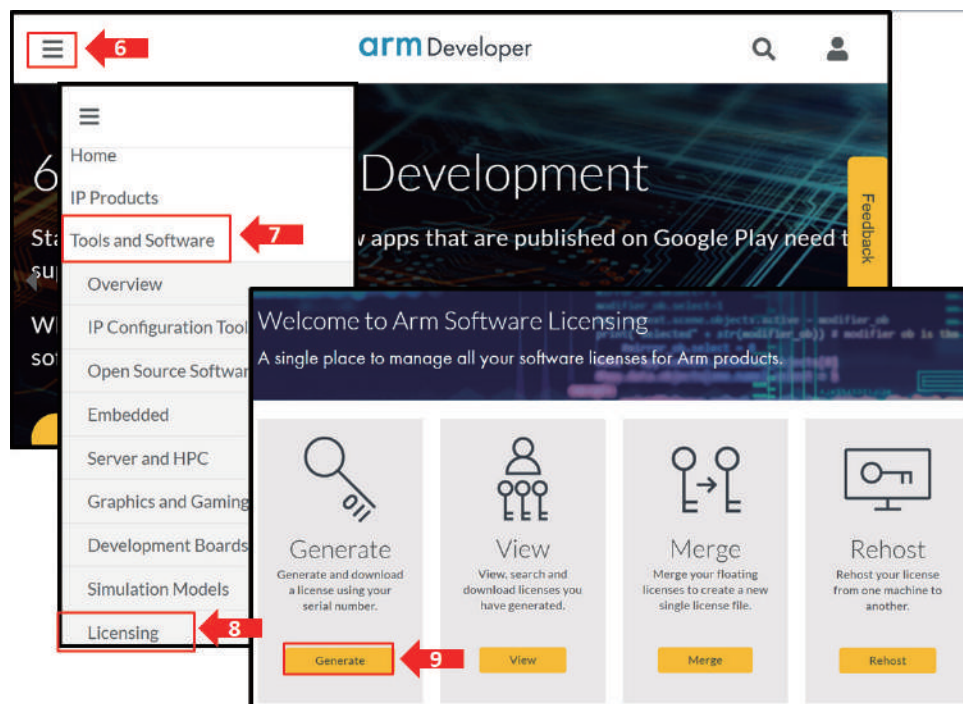
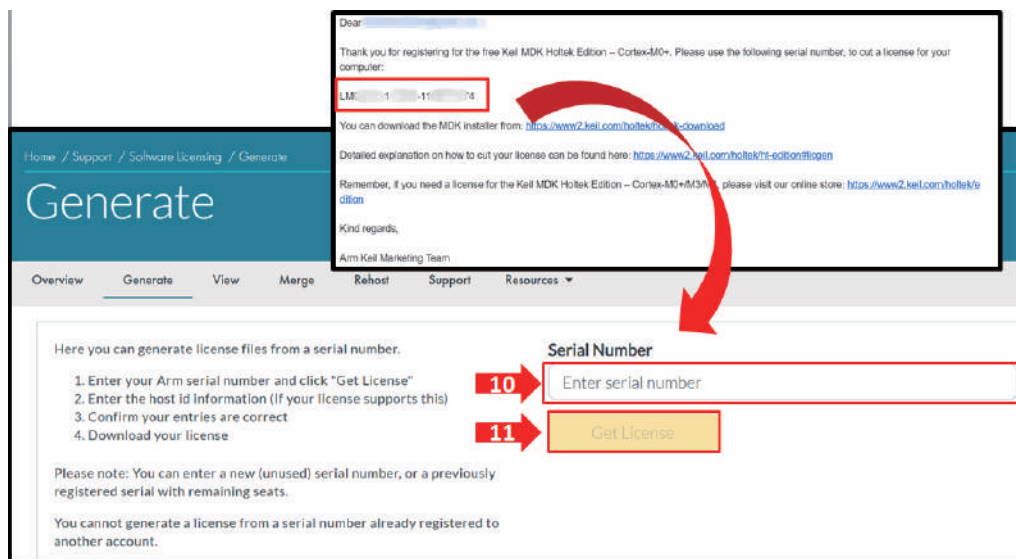


Figure 16. Apply for the Holtek Licenses – Secret Key Path

Step 10: Fill in the serial number that was sent by email in Step 3.

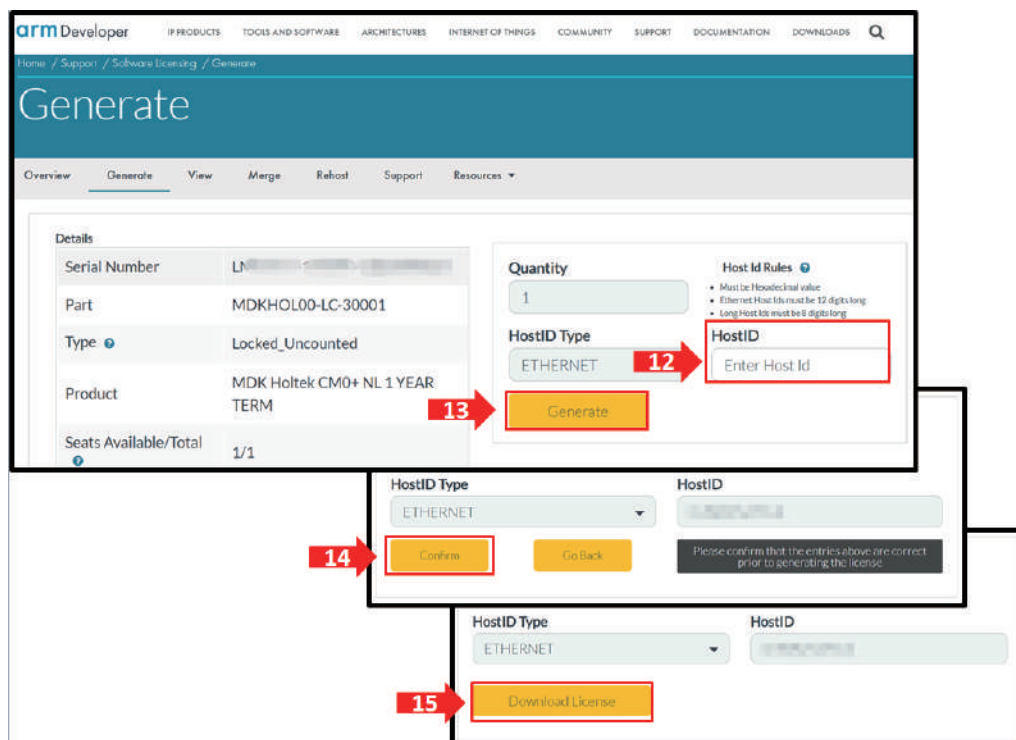
Step 11: Press the “Get License” button.



**Figure 17. Apply for the Holtek Licenses – Secret Key Generation Serial Number Input**

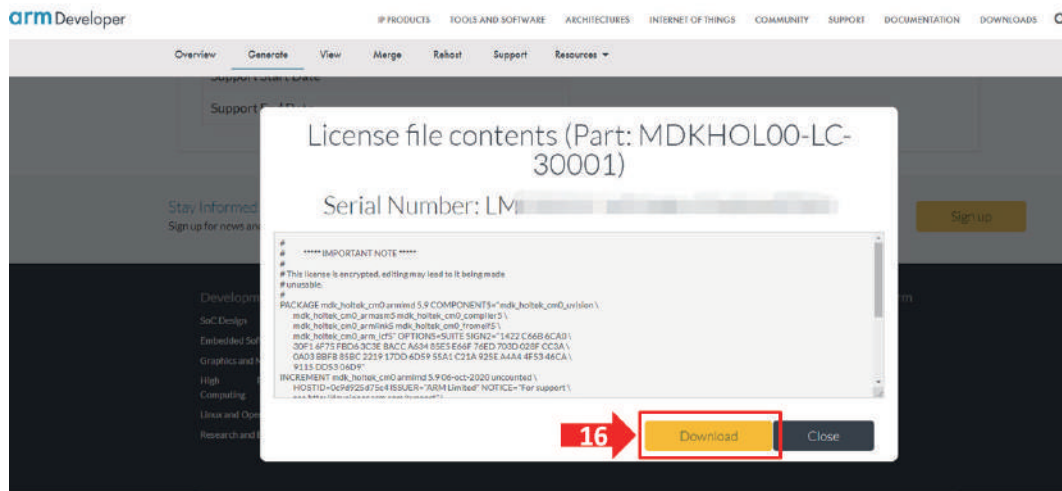
Step 12: The “Host ID” should be entered on the right, refer to the “MAC Address Look-up” section of the appendix for details.

Step 13 ~ Step 15: Press the “Generate” → “Confirm” → “Download License” buttons in that order.



**Figure 18. Apply for the Holtek Licenses – Secret Key Generation Confirmation**

Step 16: Press the “Download” button, the file name is “license.dat”.



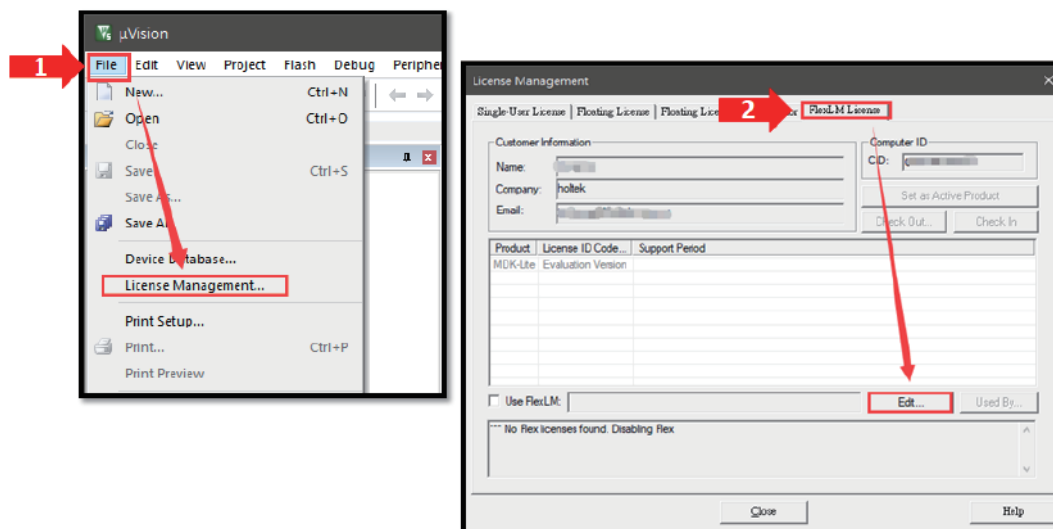
### Figure 19. Apply for the Holtek Licenses – Secret Key Download

## Activate the Holtek Licenses

The steps to activate the Holtek licenses are as follows.

Step 1: Open the Keil  $\mu$ Vision by clicking the “File”  $\rightarrow$  “License Management” buttons in order.

Step 2: Add the license by pressing the “FlexLM License” → “Edit” buttons in order.



**Figure 20. Activate the Holtek Licenses – Keil  $\mu$ Vision Activate Licenses Path**

Step 3: Select the “license.dat” file path and then press the “OK” button.

Step 4: The “FLEX Settings Modified Successfully” prompt will be generated if the settings are successful.

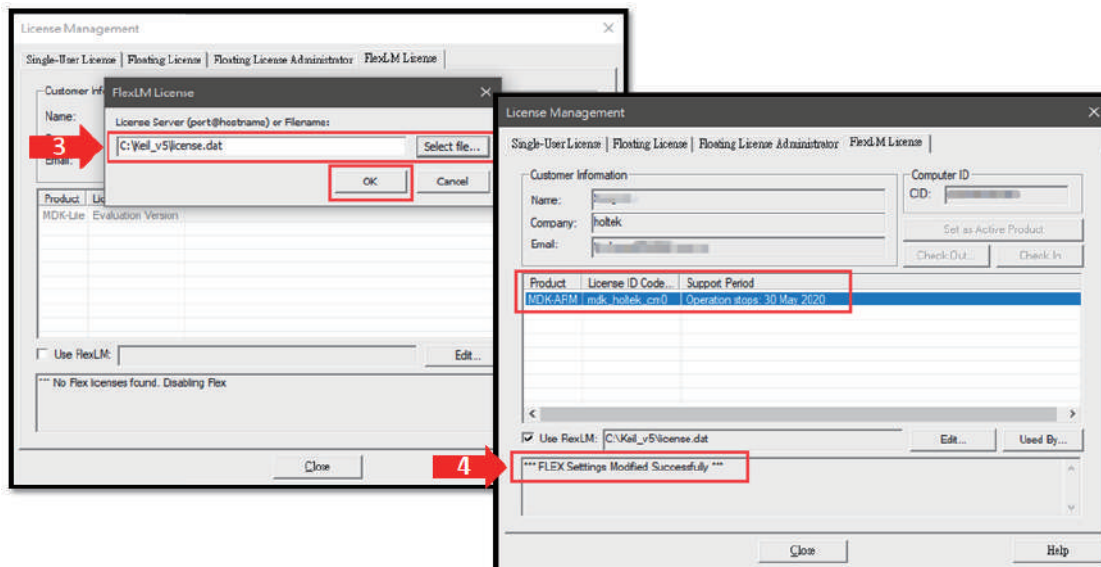


Figure 21. Activate the Holtek Licenses – Download Path Selection and Completion Confirmation

## 4. Environment Confirmation

The following confirmations can be executed to quickly verify that the development environment is operating correctly.

- HT32 Family Pack Installation
- Firmware Library Debugging

### HT32 Family Pack Installation

The installation confirmation steps of the HT32 family Pack are shown in the following.

Step 1: The Keil  $\mu$ Vision software must be opened, press the “Pack Installer” to continue.

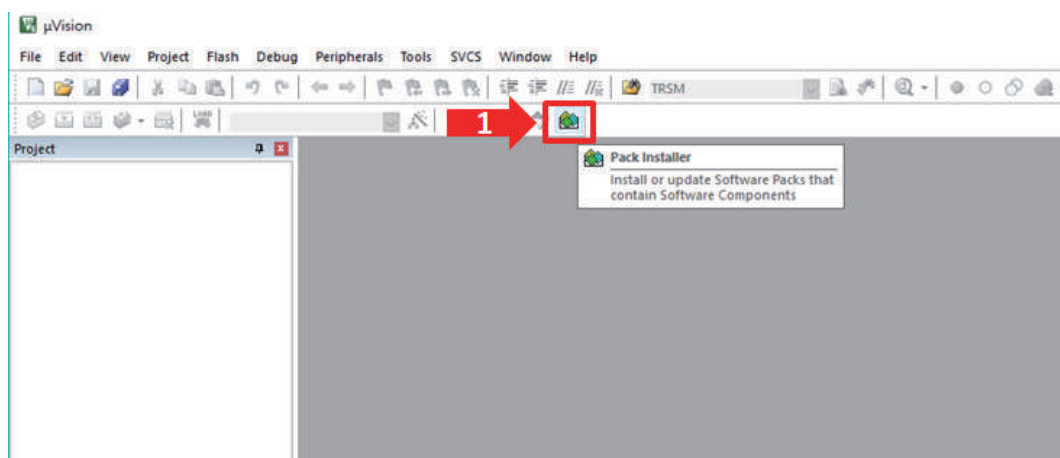


Figure 22. HT32 Family Pack Installation – Keil  $\mu$ Vision Pack Installer Open Path



Step 2 ~ Step 3: Press the “OK” button when a “Welcome to the Keil Pack Installer” prompt will be generated after it has been read/downloaded.

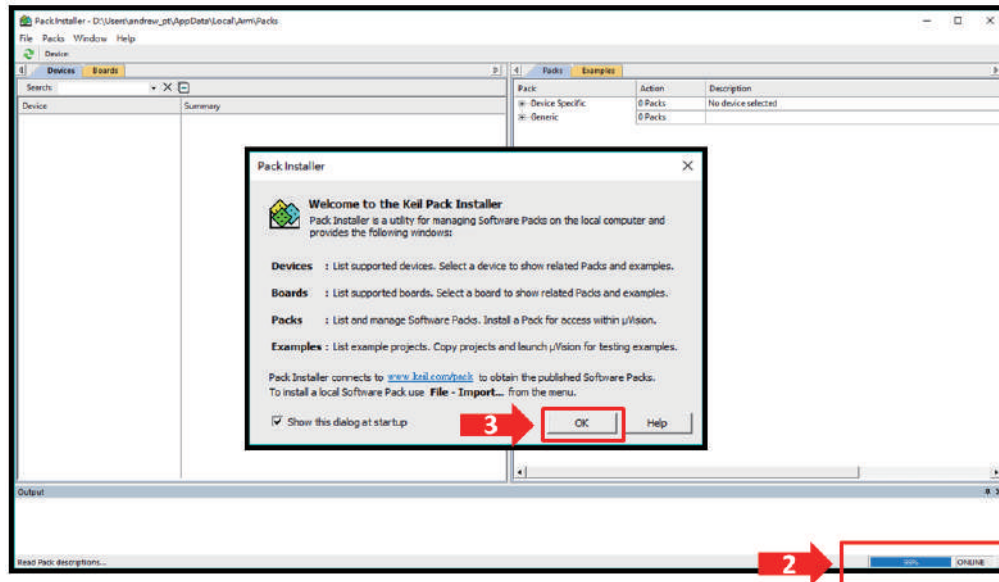


Figure 23. HT32 Family Pack Installation – Pack Read

Step 4: The Holtek devices can be searched by entering the Holtek keyword or by searching for them in the drop-down menu.

Step 5: Click on “Holtek” below the “Device”, the “Holtek::HT32\_DFP” will be generated on the right.

Step 6: Click on “Install” and then the “Up to date” will display to indicate the installation is complete.

Users can get information from the following website and double-click to install the Pack directly in an offline environment:

[http://mcu.holtek.com.tw/pack/Holtek.HT32\\_DFP.latest.pack.zip](http://mcu.holtek.com.tw/pack/Holtek.HT32_DFP.latest.pack.zip)

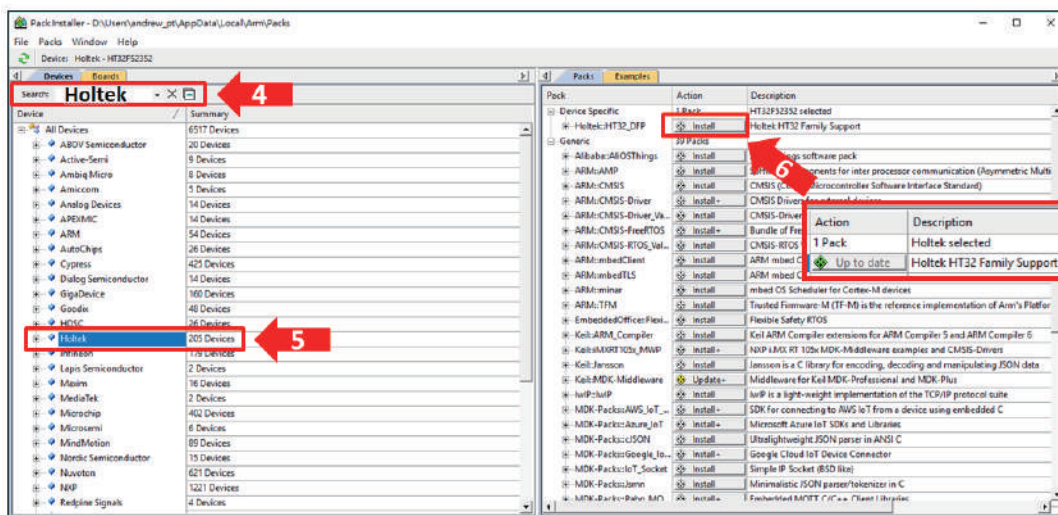


Figure 24. HT32 Family Pack Installation – Holtek Pack Search&Download and Path Confirmation

## Firmware Library Debugging

The following shows an example of such a hardware circuit using the HT32F52352 Starter Kit.

Step 1: Download the firmware library compressed file from the Holtek website and unzip it. The file name is “HT32\_STD\_5xxxx\_FWLib\_vnnn\_yyyy”, where “nnn” represents the version number.

Step 2: Click the “HT32\_STD\_5xxxx\_FWLib\_vnnn\_yyyy” → “project\_template” → “IP” → “Example” → “MDK\_ARMv5” → “Project\_XXXXX.uvprojx”, where “XXXXX” represents the MCU part number. This installation guide takes the HT32F52352 as a debugging example.

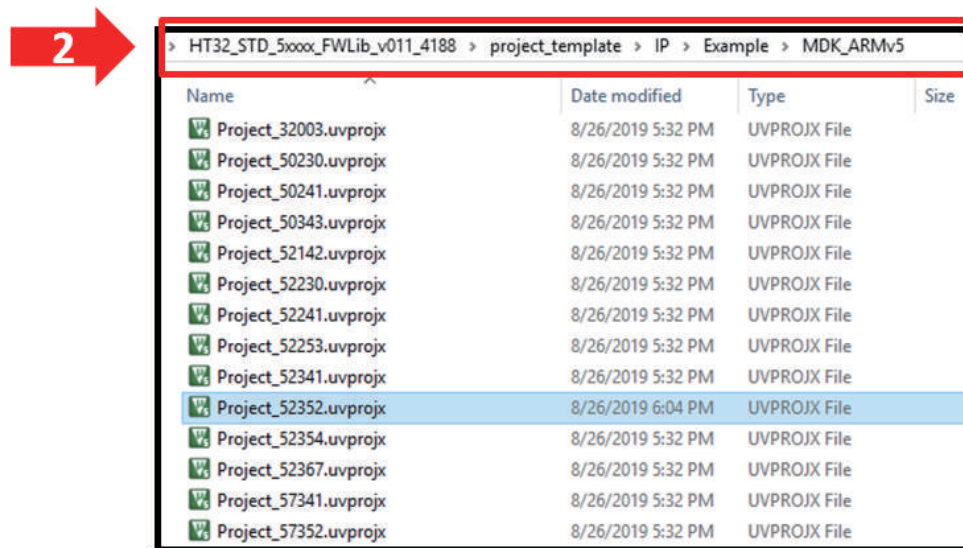


Figure 25. Firmware Library Debugging – Keil µVision Project Open Path

Step 3: Click on “Build (F7)”.

Step 4: Check on the “Build Output” window to observe whether the program compilations are correct.

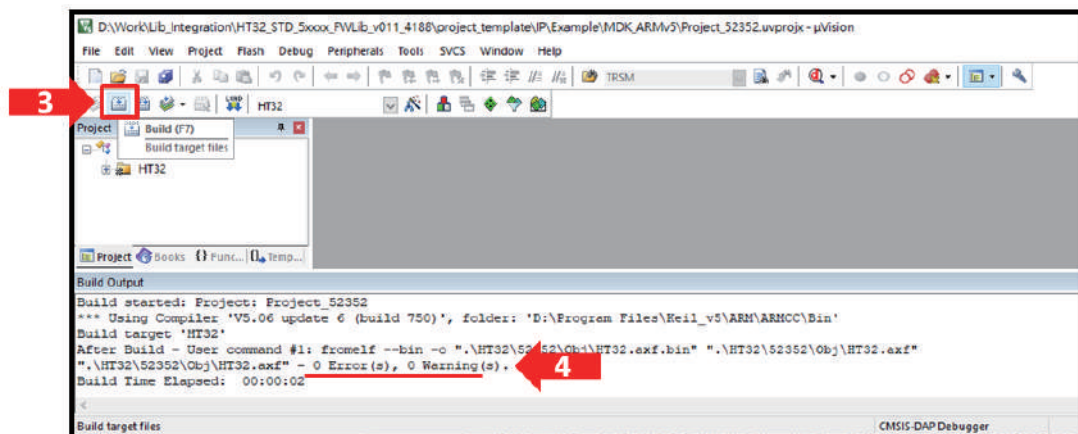


Figure 26. Firmware Library Debugging – Compilation and Compilation Confirmation



Step 5: The e-link32 lite USB port on the HT32F52352 Starter Kit is connected to a PC as shown on the left. Confirm that the PC has detected the USB device normally, as shown in the right corner.

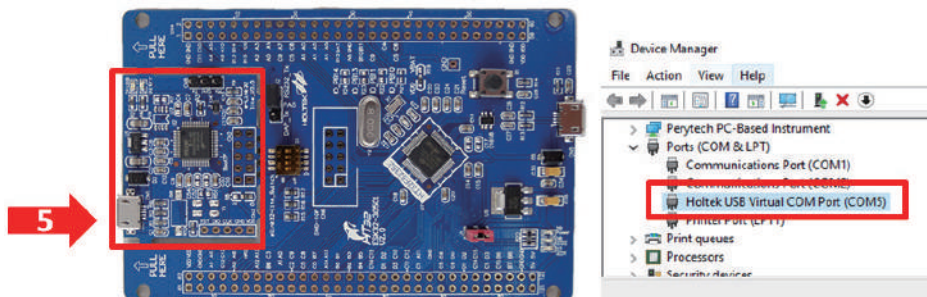


Figure 27. Firmware Library Debugging – HT32F52352 Starter Kit and PC Devices Manager

Step 6: Click on “Download (F8)”.

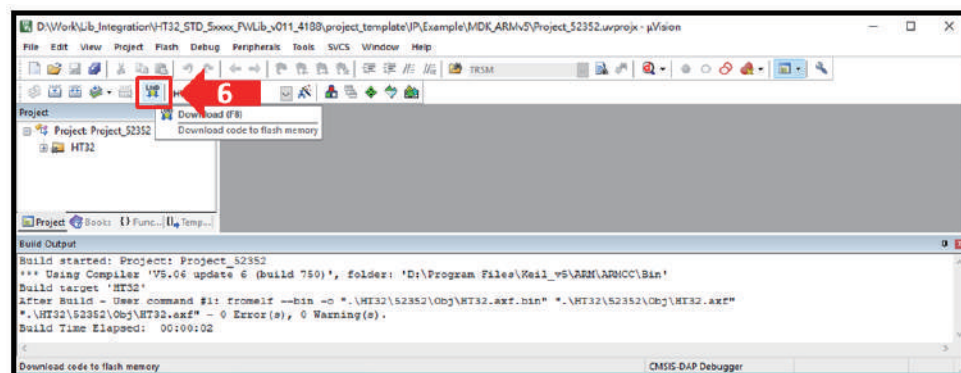


Figure 28. Firmware Library Debugging – Programming Interface

Step 7: Connecting a jumper to short the DAP\_TX and PA5 pins. Configure the PC UART transmission software, the COM port depends on the step 5 settings, such as Baud Rate=115200, Data=8-bit, Parity=none, Stop bits=1-bit and Flow Control= none.

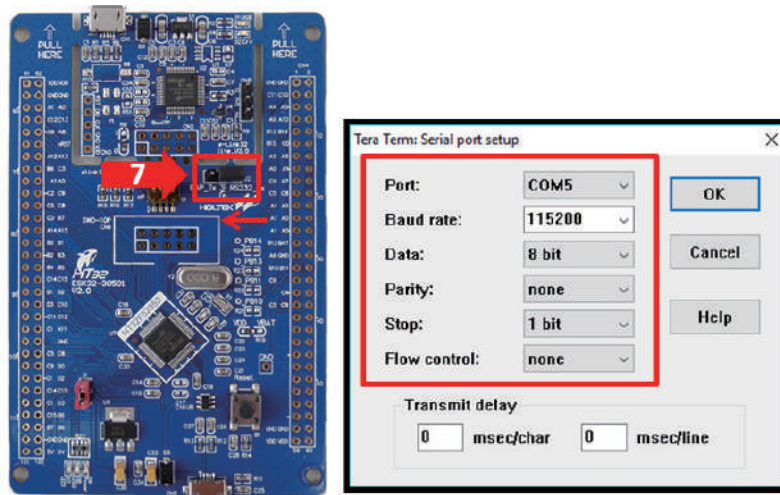


Figure 29. Firmware Library Debugging – HT32F52352 Starter Kit and PC Transmission Configuration

Step 8: When the Reset key is pressed, LED1 and LED2 will flash as observed in the lower left. The “Hello World! 0” ~ “Hello World! 99” words will display on the Tera Term of the PC via the Virtual COM port, as shown on the right. This indicates that the environmental debugging is complete.

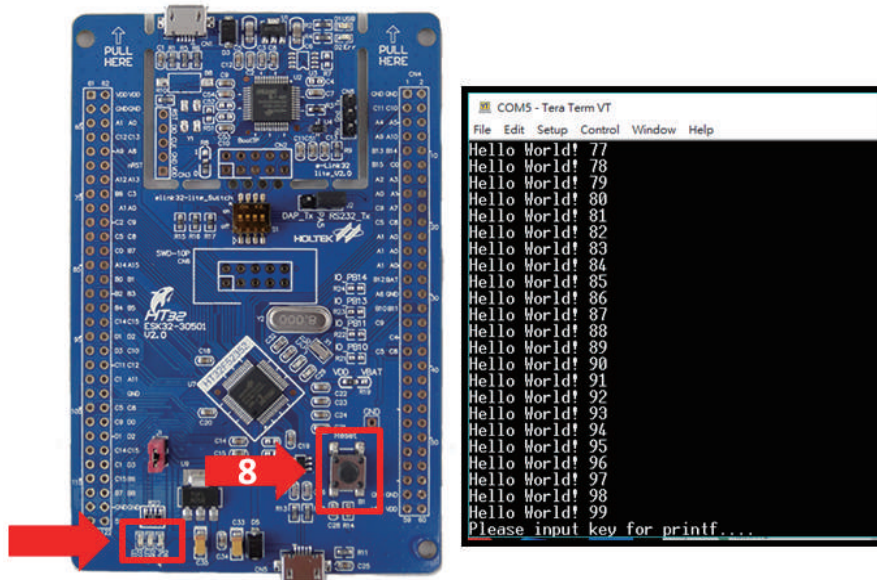


Figure 30. Firmware Library Debugging – HT32F52352 Starter Kit and Tera Term Display Interface

## Appendix: MAC Address Look-up

### Windows 7 Look-up Entity Address Steps

Step 1: Open the internet access icon, , at the bottom right of the windows toolbar.

Step 2: Click the “Open Network and Sharing Center”

Step 3: Click the “Local Area Connection”.

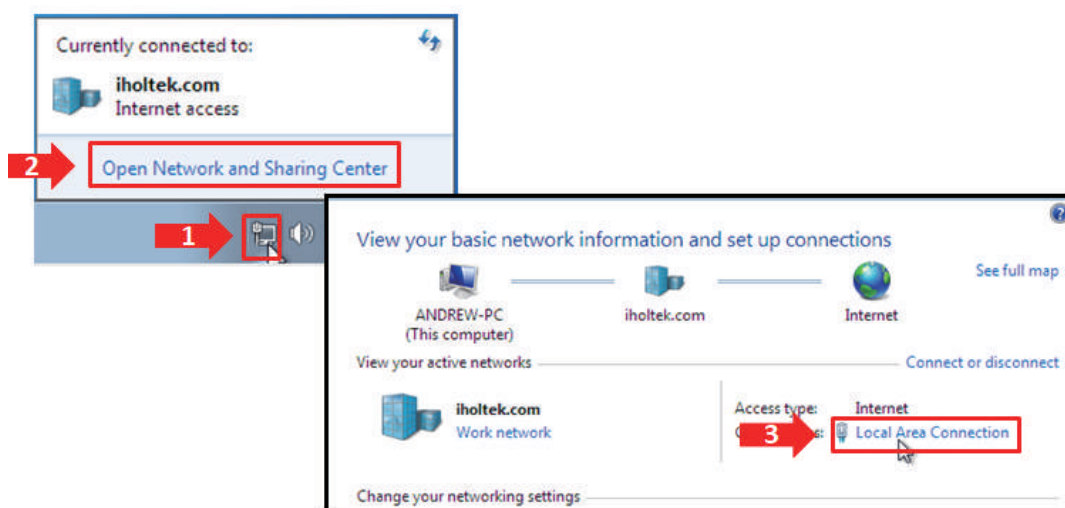


Figure 31. Local Area Connection Status Open Path

Step 4: Click on “Details”.

Step 5: Fill in the entity address, Host ID.

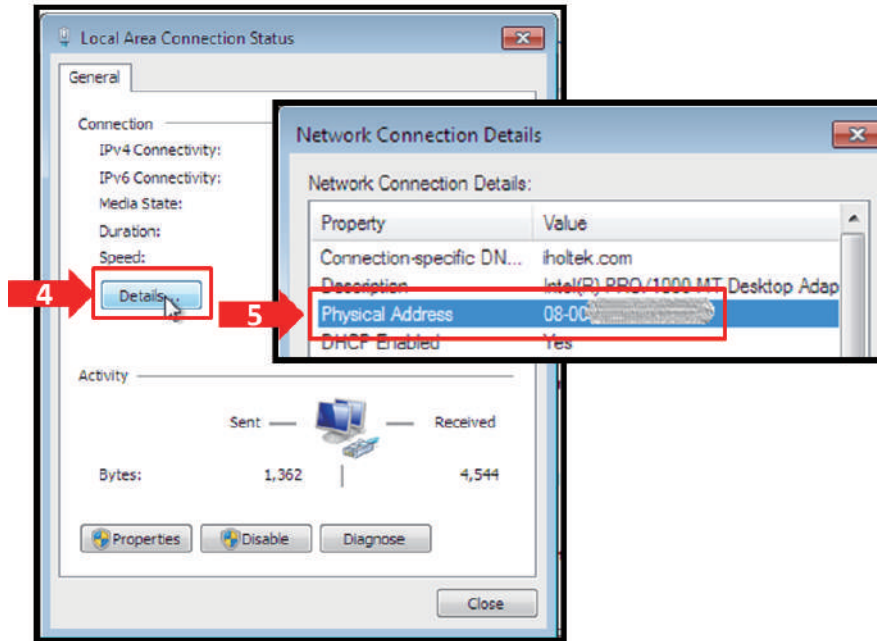


Figure 32. Network Connection Entity Address MAC

### Windows 10 Look-up Entity Address Steps

Step 1: Open the internet access icon, , at the bottom right of the windows toolbar.

Step 2: Click the “Network & Internet Settings”.

Step 3: Click the “View your network properties”.

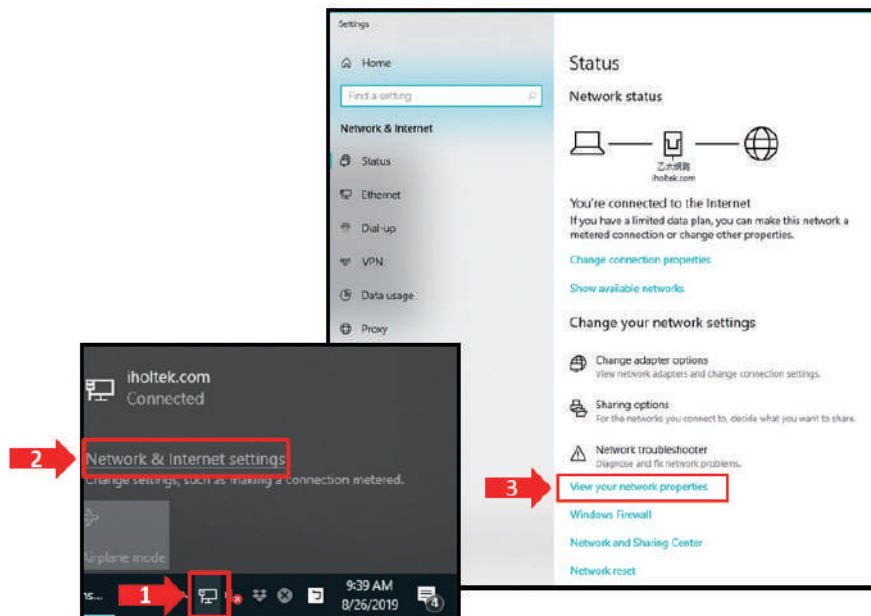
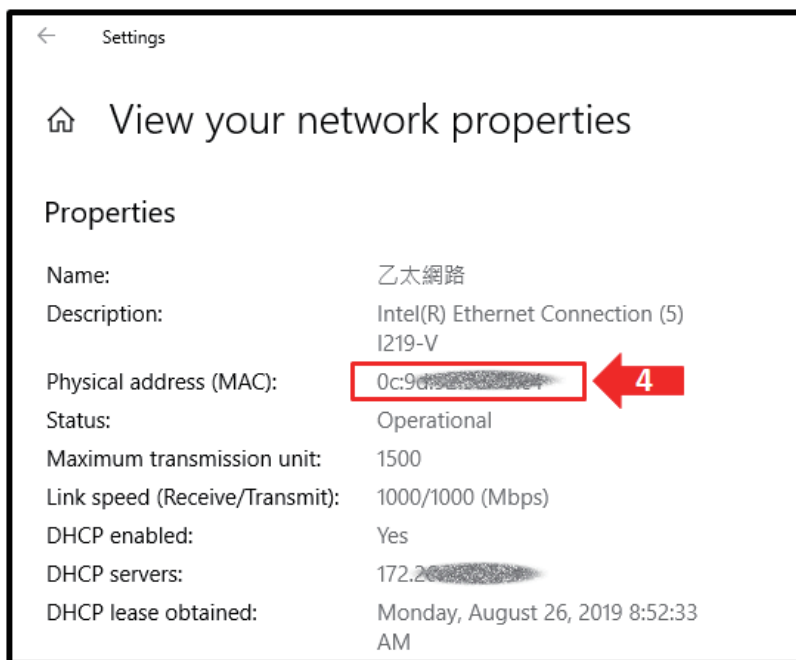


Figure 33. Local Area Connection Status Open Path

Step 4: Fill in the entity address, Host ID.



**Figure 34. Network Connection Entity Address MAC**

## Reference Material

Reference files: HT32\_Keil-QuickStart and e-Link32\_e-Link32 Pro User's Guide.

For more information refer to the Holtek official website [www.holtek.com](http://www.holtek.com).

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