Keil® MDK Holtek Edition (Free)

Installation Guide

Revision: V1.20 Date: December 20, 2024

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 32KB of code size. The following steps show how to download the Keil MDK-ARM software.

Step 1: Download from the https://www.keil.com/demo/eval/arm.htm website, and the following screen will appear.

Step 2: Enter your contact information.

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.

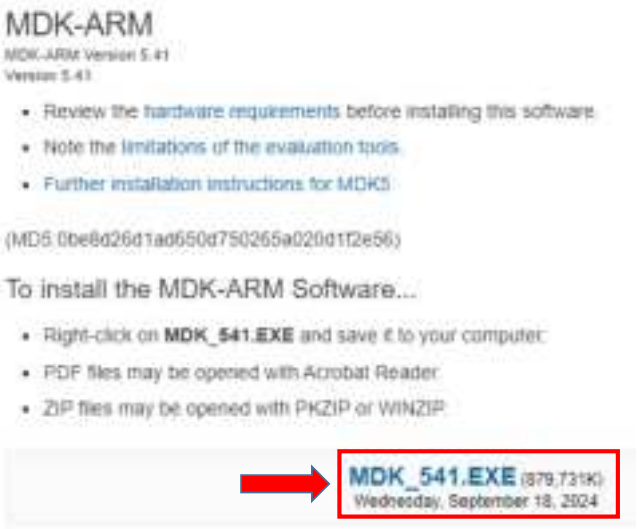

Figure 2. Keil MDK-ARM Installation File Download

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.

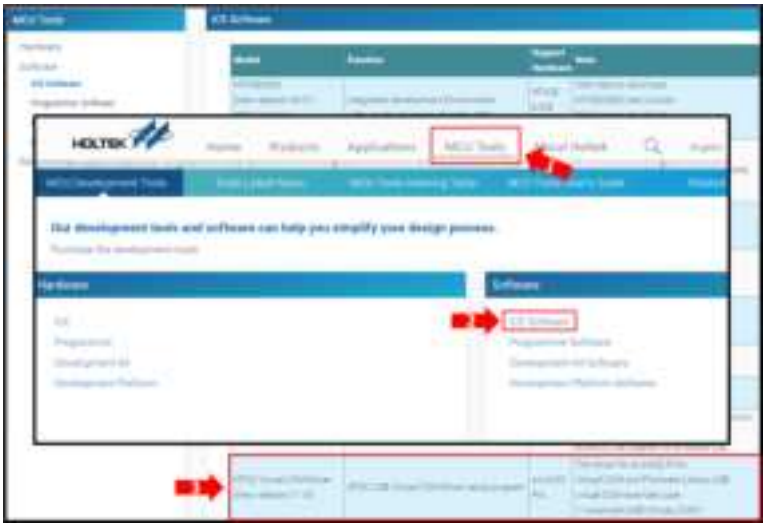

Figure 3. HT32 Virtual COM Drive Obtain – Download Path

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.

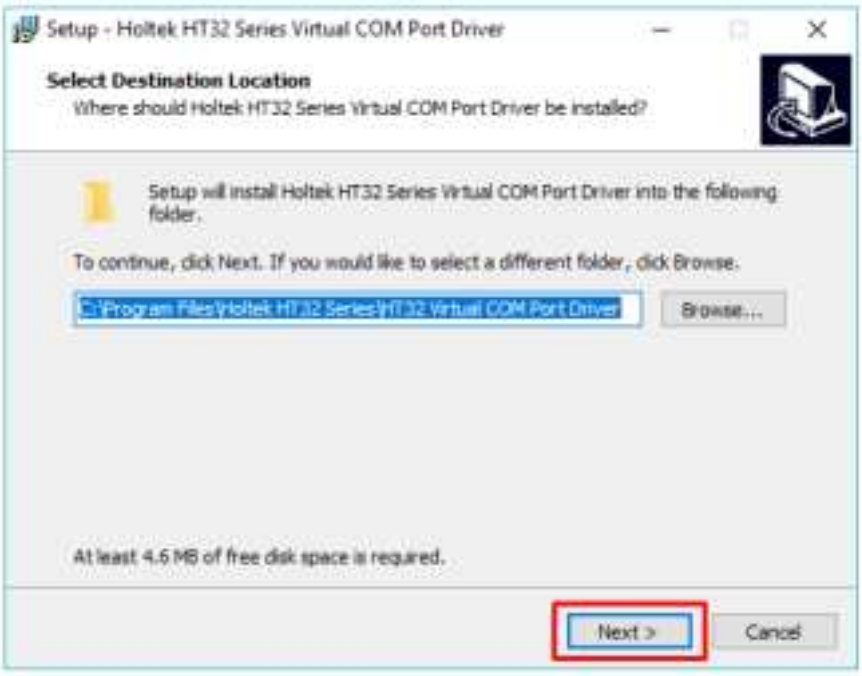

Figure 4. HT32 Virtual COM Drive Installation – Destination Path

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

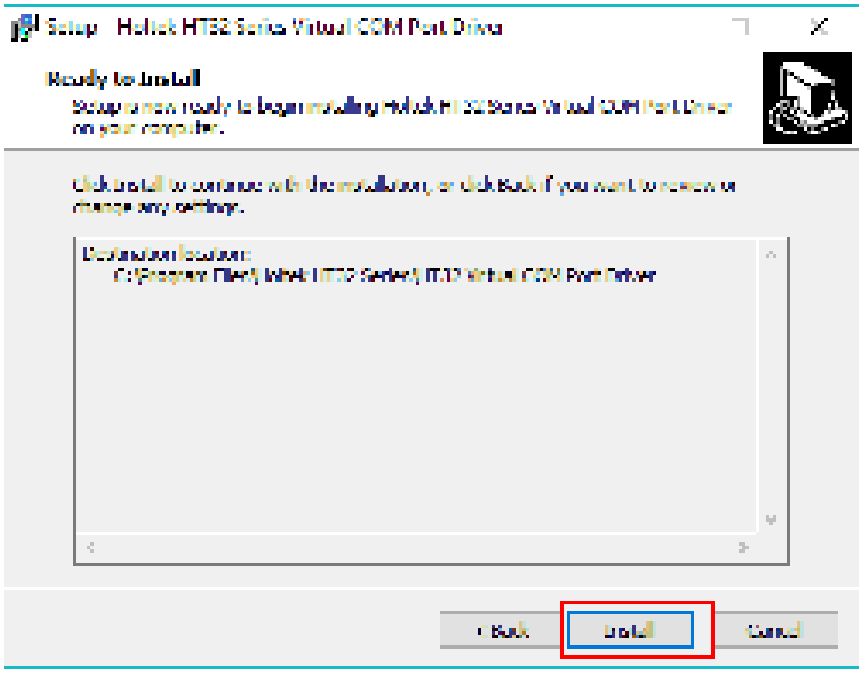

Figure 5. HT32 Virtual COM Drive Installation – Installation Confirmation

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".

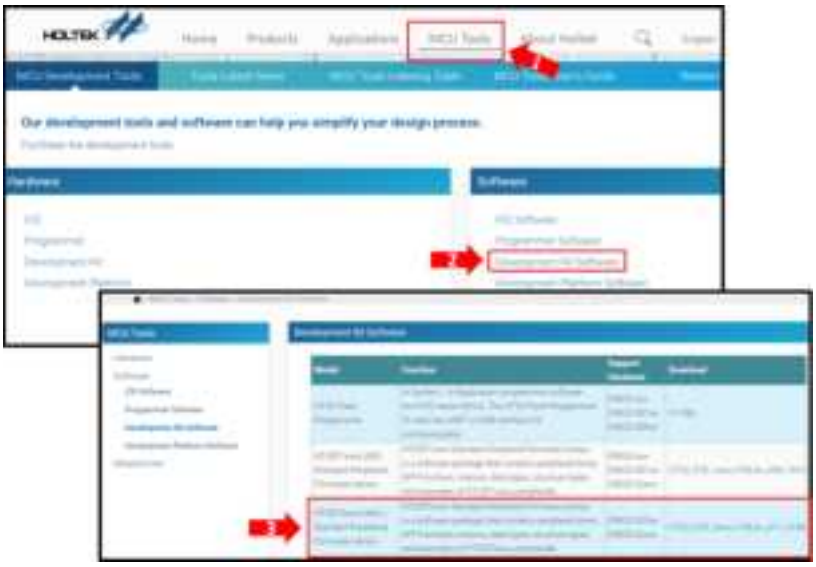

Figure 7. Firmware Library Download Path

3. Installation Process

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

- Keil MDK-ARM installation
- 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.

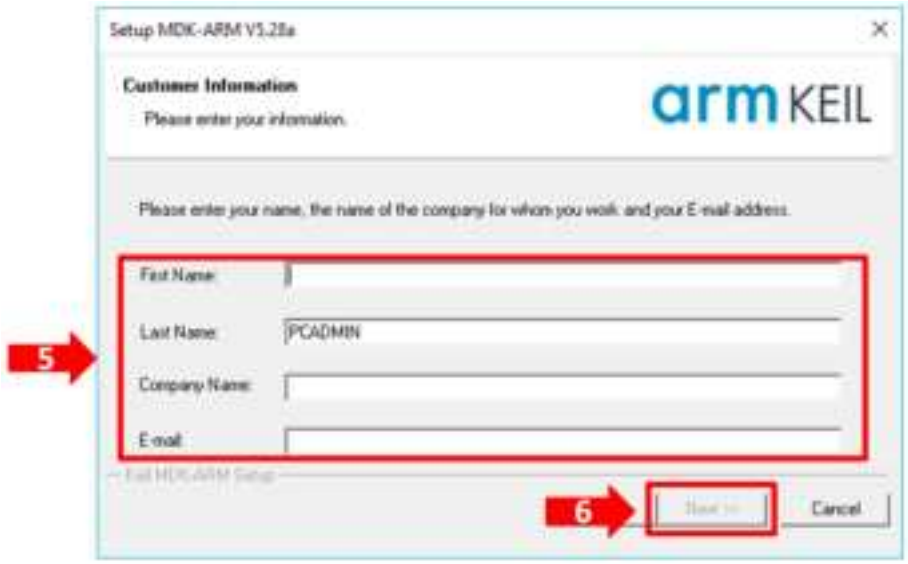

Figure 11. Keil MDK-ARM Installation – Personal Information

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

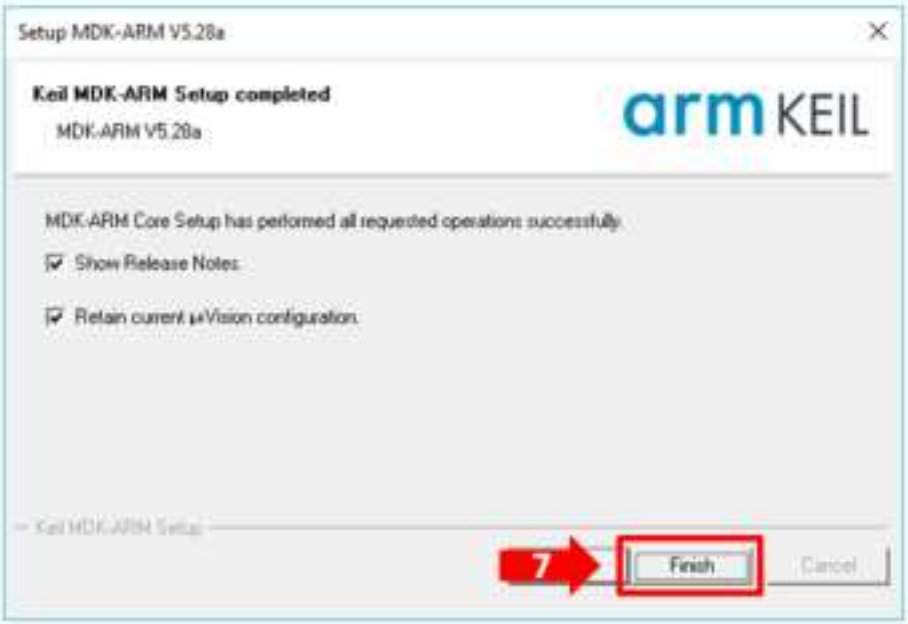

Figure 12. Keil MDK-ARM Installation – Completion

Activate the Holtek Licenses

For the Keil MDK v5.37 or later version, refer to the instructions on the ARM official website or the following steps to activate the Holtek licenses:

Step 1: Open the µVision and go to "File" → "License Management…" and select the "User-Based License" tab. Click the "Activate/Deactivate…" button.

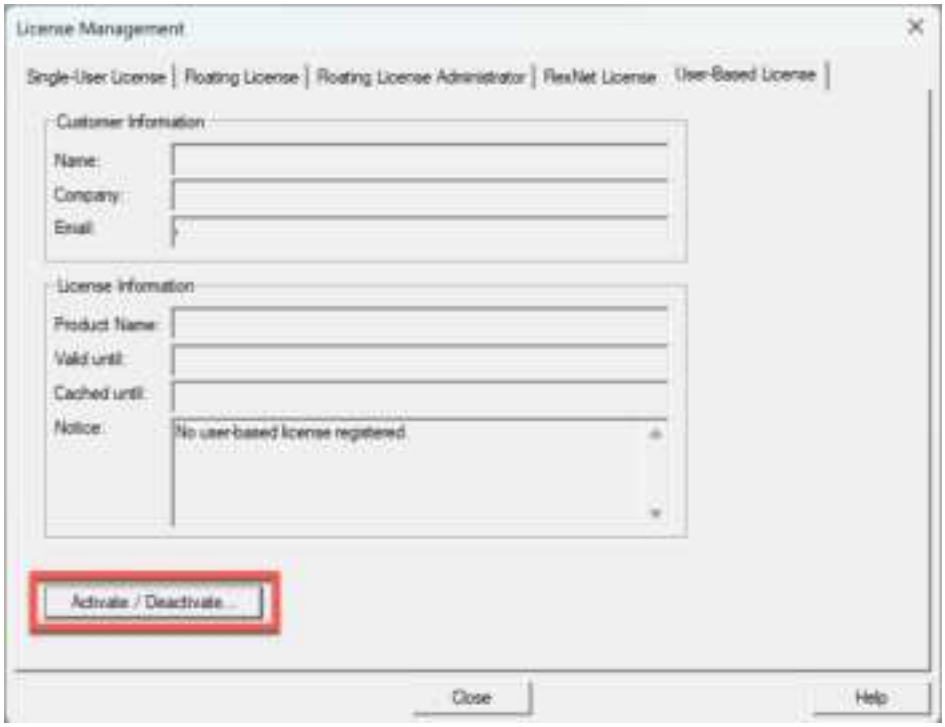

Figure 13.

Step 2: Follow the numerical steps labeled in the following figure.

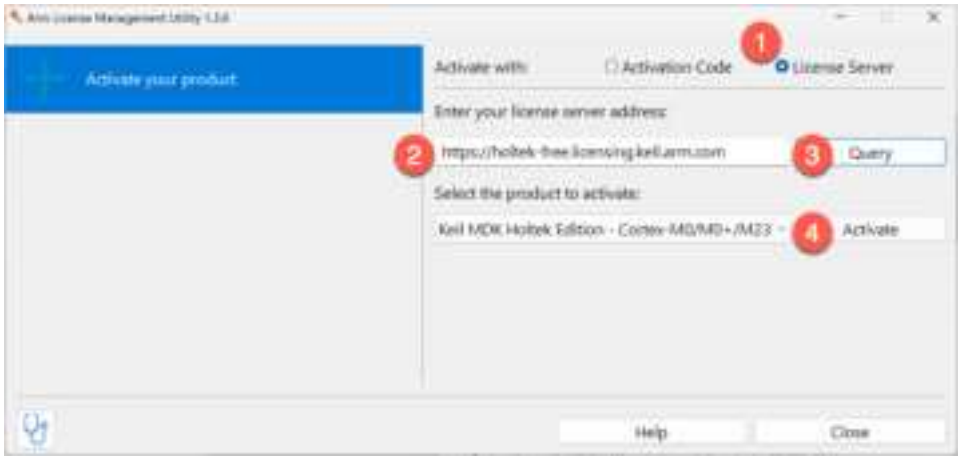

Figure 14.

1. Enable "License Server".
2. Enter the following license server address:
   https://holtek-free.licensing.keil.arm.com.

3. Click the “Query” button.
4. Click on the “Activate” button. The window changes and shows the information of the activated license in the following figure.

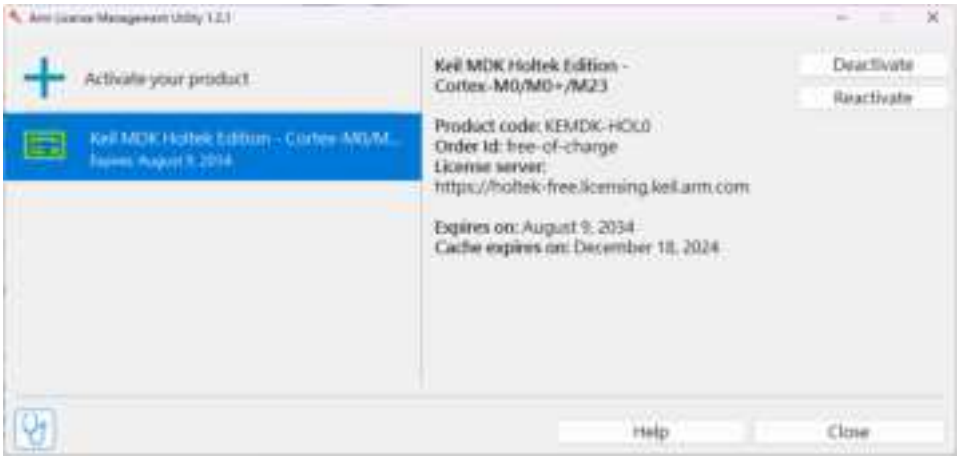

Figure 15.

If the following error message appears during compilation, change the compiler version as in Figure 16.

*** Error: The configured compiler version ‘5.06 update 7 (build 960)’ does not support the selected User Based Licensing technology.”

*** Build aborted.

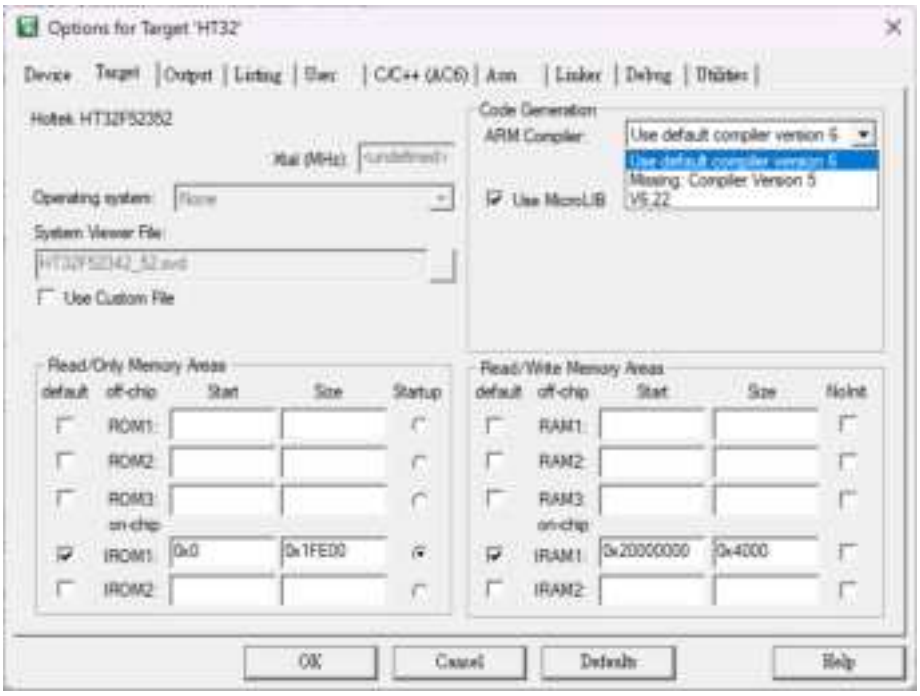

Figure 16.

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: Open the Keil µVision software and press the "Pack Installer" to continue.

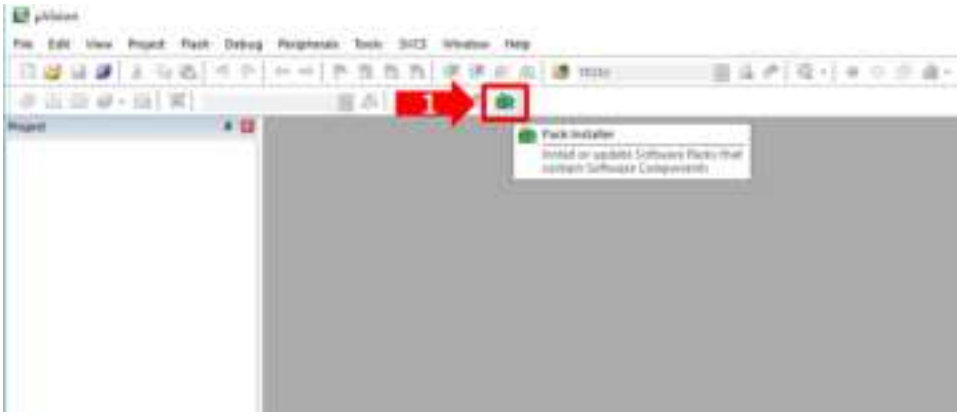

Figure 17. HT32 Family Pack Installation – Keil µVision Pack Installer Open Path

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 18. 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 data” will display to indicate the installation is complete.

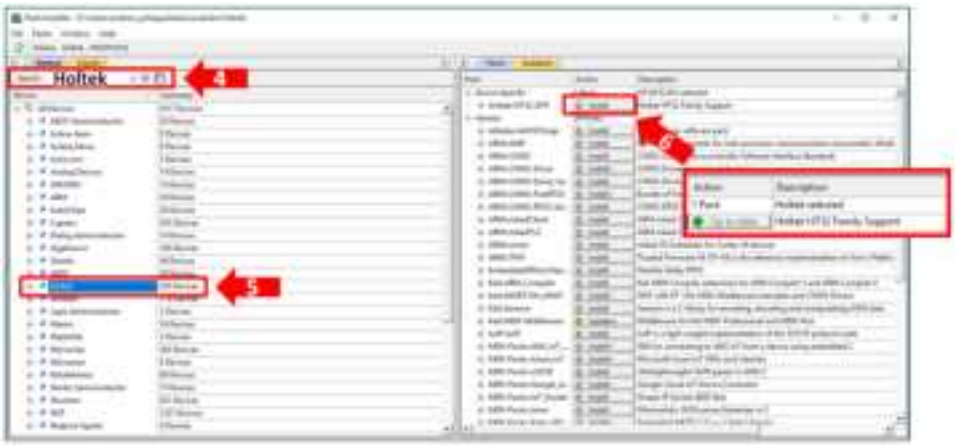

Figure 19. HT32 Family Pack Installation – Holtek Pack Search&Download and Path Confirmation

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.

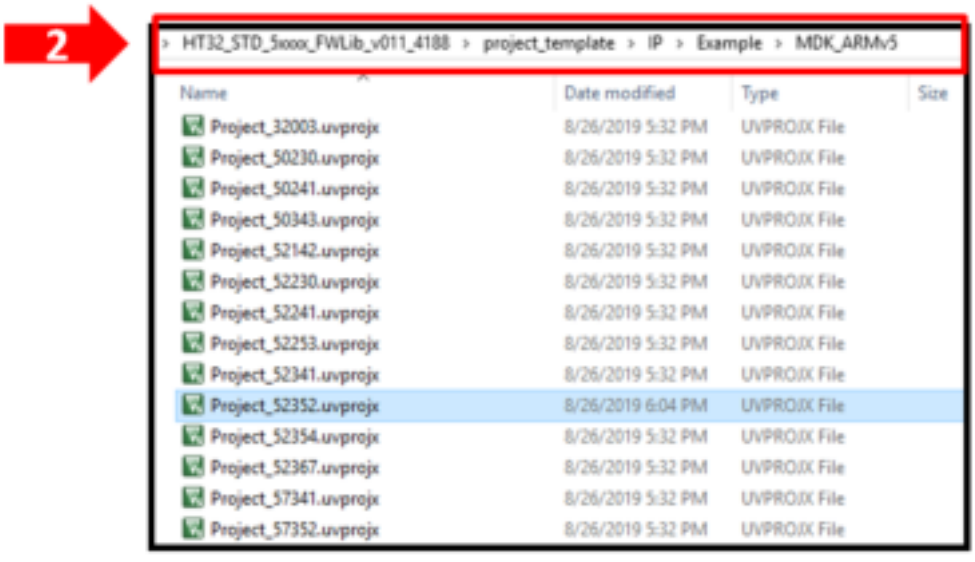

Figure 20. Firmware Library Debugging – Keil µVision Project Open Path

Step 3: Click on “Build (F7)”.

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

Figure 21. 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.

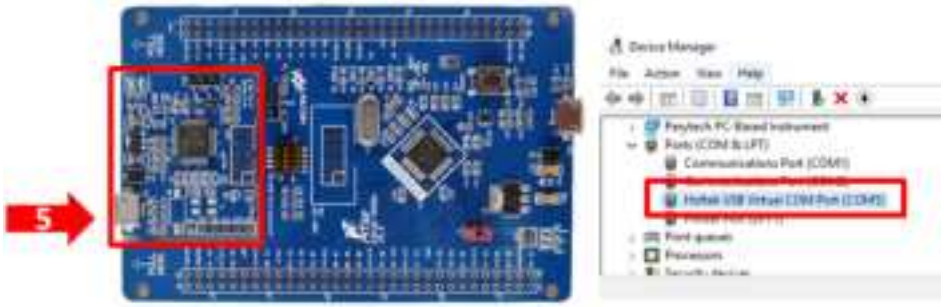

Figure 22. Firmware Library Debugging – HT32F52352 Starter Kit and PC Devices Manager

Step 6: Click on “Download (F8)”.

Figure 23. 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.

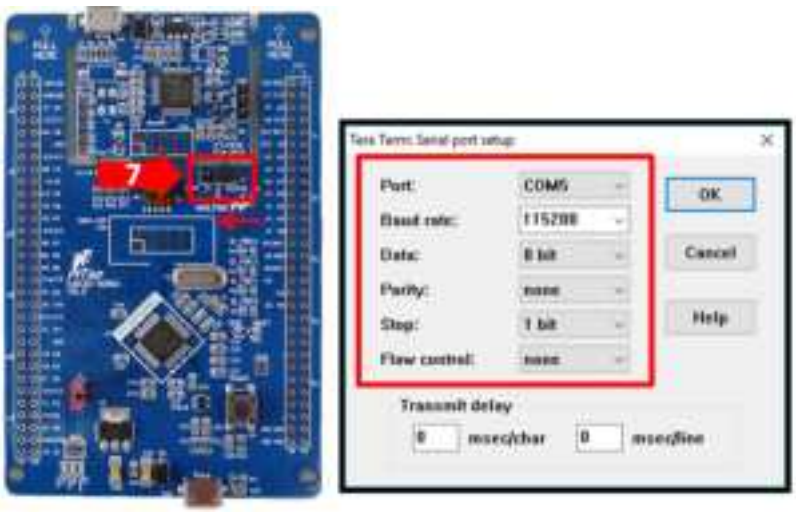

Figure 24. Firmware Library Debugging – HT32F52352 Starter Kit and PC Transmission Configuration

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.

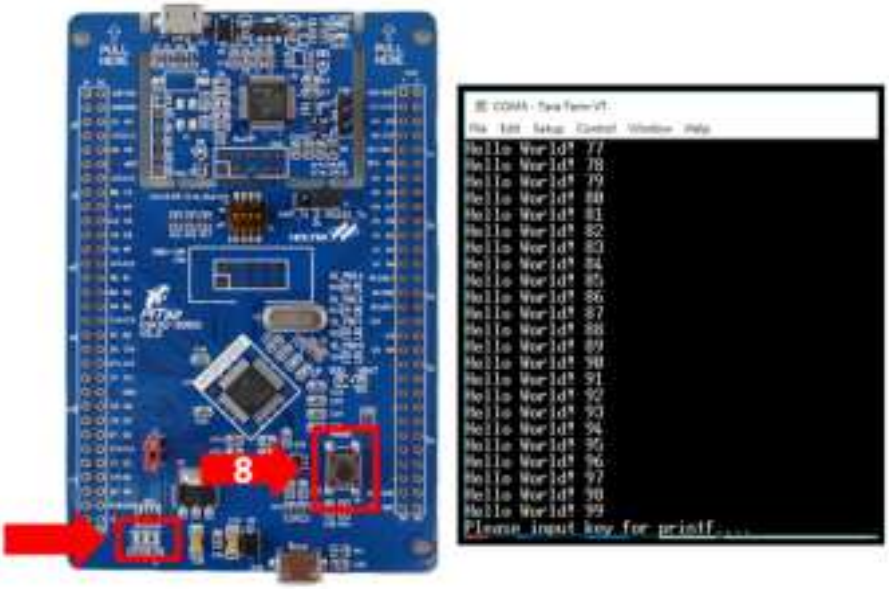

Figure 25. Firmware Library Debugging – HT32F52352 Starter Kit and Tera Term Display Interface

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 26. Local Area Connection Status Open Path

Step 4: Click on “Details”.

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

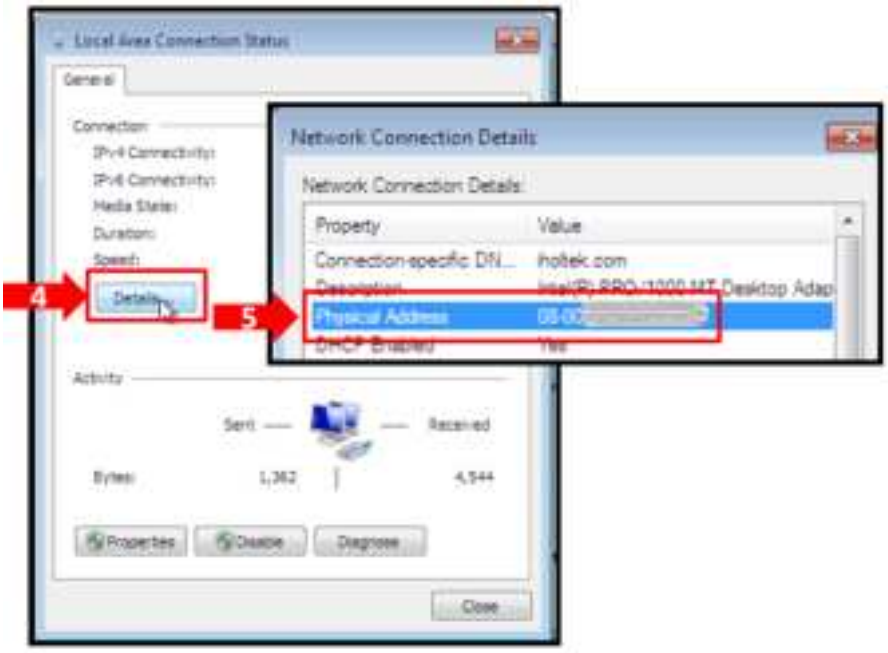

Figure 27. Network Connection Entity Address MAC

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”.

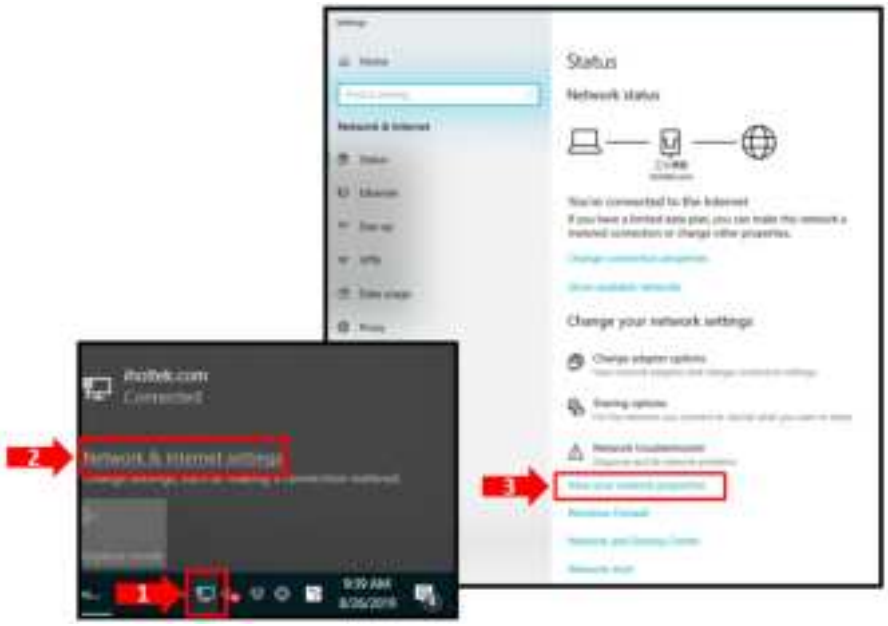

Figure 28. Local Area Connection Status Open Path

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

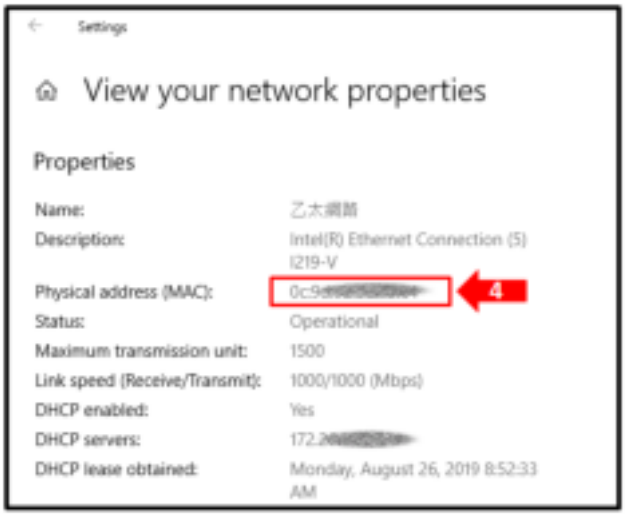

Figure 29. Network Connection Entity Address MAC

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 https://www.holtek.com.