AmebaD Amazon FreeRTOS Getting Started Guide

1 Getting Started with the amebaD

The AmebaD board is able to use the amazon-freertos sdk version 202002.00. The AmebaD Demo board is designed by Realtek and is Wi-Fi ready chip(https://www.amebaiot.com/ameba-sdk-summary/).

1.1 Hardware Components

AmebaD Demo Board (https://www.amebaiot.com/amebad/).

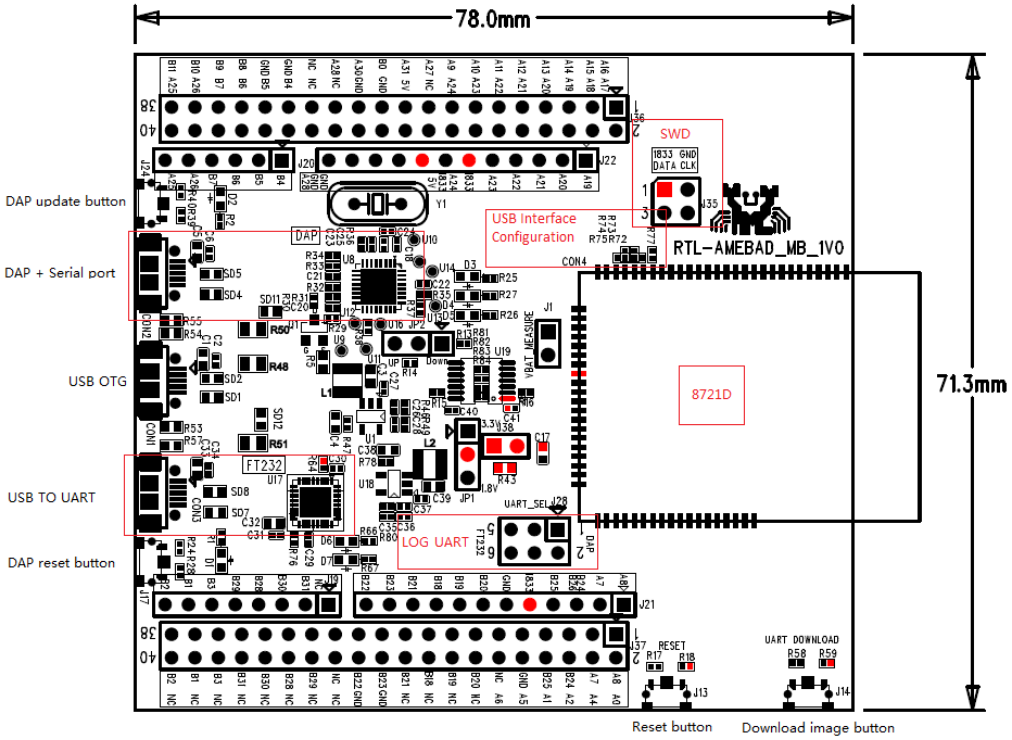


Fig 1-1 AmebaD Demo board

1.2 Supported Development Environment

Currently the amazon-freertos of AmebaD is supported by the IAR Embedded workbench ver.8.30.1. For windows operating system only.

1.3 Pre-Requisite

- Required source code.
- AmebaD Demo board
- IAR Embedded Workbench ver.8.30.1
- Realtek Image Tool

2 IAR Build Environment Setup

This chapter illustrates how to setup IAR development environment for Realtek Ameba-D SDK, including building projects, downloading images and debugging.

2.1 Requirement

2.1.1 IAR Embedded Workbench

IAR provides an IDE environment for code building, downloading, and debugging. Check “IAR Embedded Workbench” on http://www.iar.com/, and a trail version is available for 30 days.

Note: To support ARMv8-M with Security Extension (Ameba-D HS CPU, also called KM4), IAR version must be 8.30 or higher.

2.2 How to Use IAR SDK?

2.2.1 IAR Project Introduction

Because Ameba-D is a dual-core CPU platform, two workspaces are provided to build for each core in **projects\realtek\amebaD\IAR\aws_tests**

- Project_lp_release.eww (KM0 workspace) contains the following projects:
  - km0_bootloader
  - km0_application
- Project_hp_release.eww (KM4 workspace) contains the following projects:
  - km4_bootloader
  - km4_application

2.2.2 IAR Build

When building SDK for the first time, you should build both KM0 project and KM4 project. Other times, you only need to rebuild the modified project.

2.2.2.1 Building KM0 Project

The following steps show how to build KM0 project:

(1) Open **projects\realtek\amebaD\IAR\aws_tests\Project_lp_release.eww**.

(2) Make sure km0_bootloader and km0_application are in Workspace. Click **Project** > **Options**, **General Options** > **Target** > **Processor Variant** > **Core**, verify the CPU configurations according to Fig 2-1.

(3) Right click the project and choose “Rebuild All”, as Fig 2-2 shows. The km0_bootloader and km0_application should compile in order.

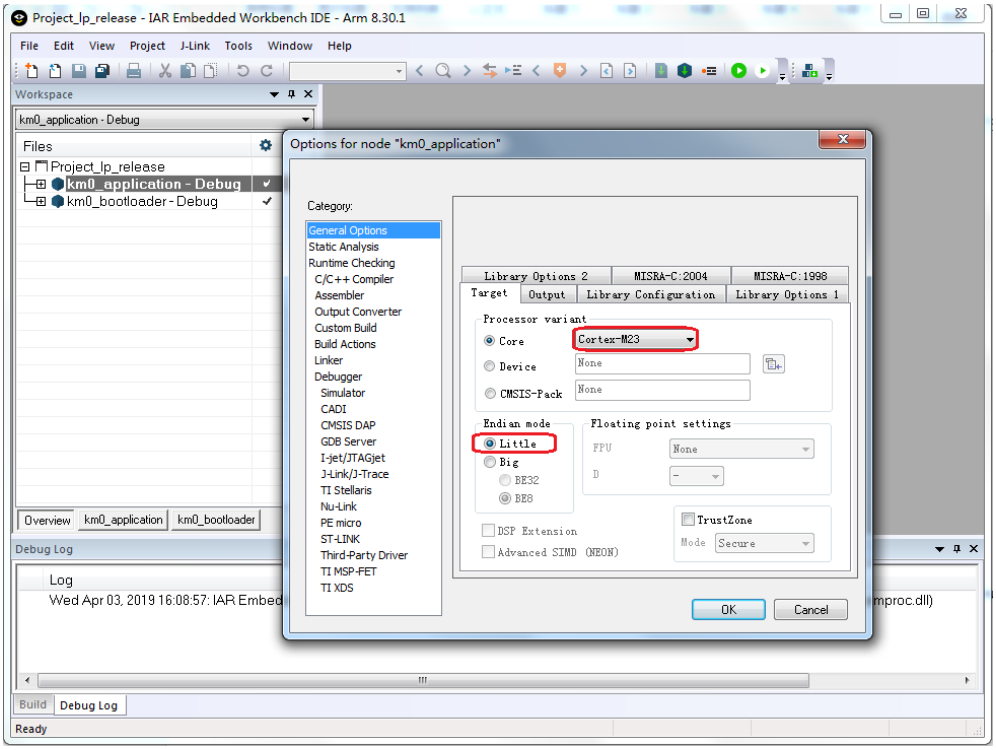


Fig 2-1 KM0 processor options

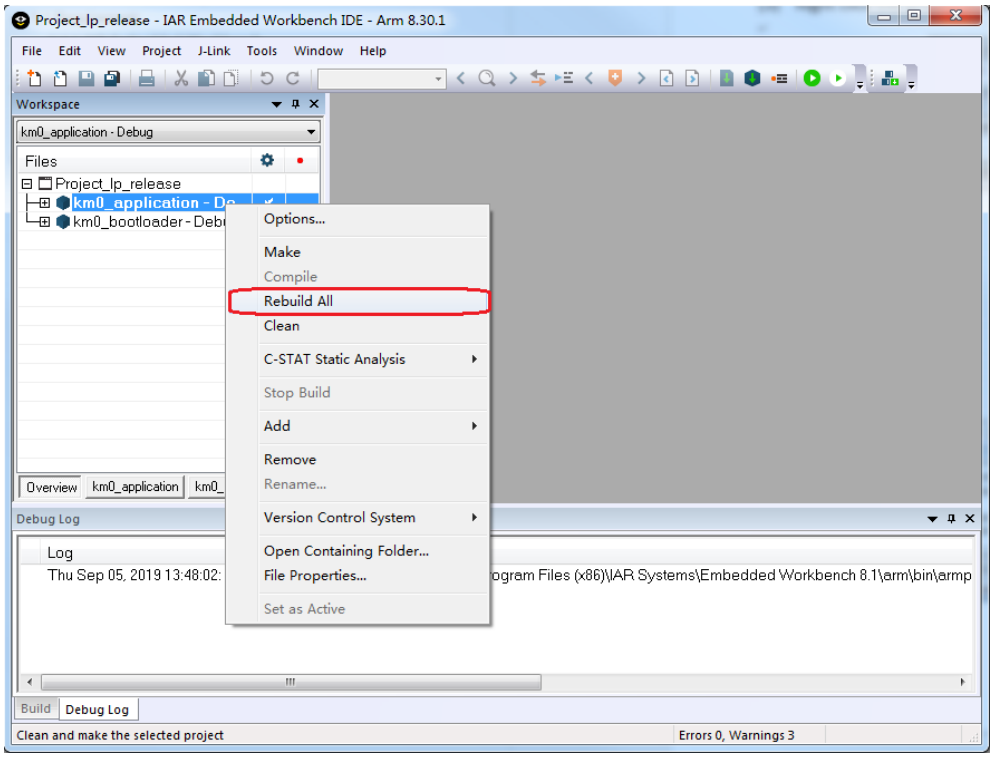
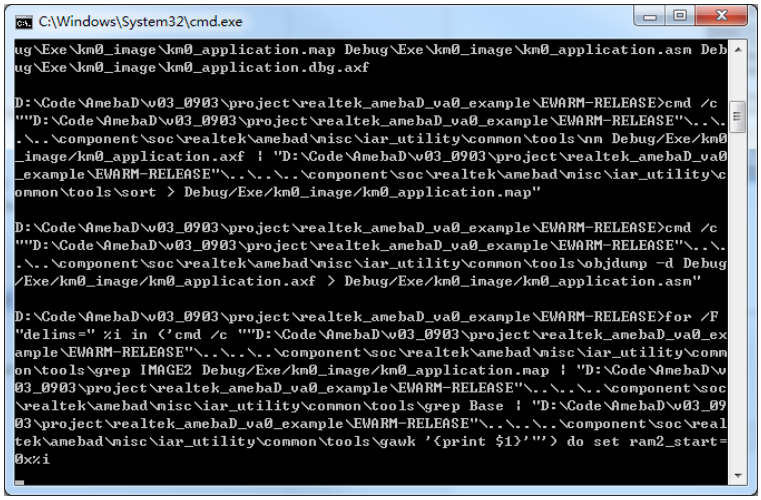


Fig 2-2 Building KM0 project

Note: After building each project, IAR will pop up a command prompt window to execute post-build action to generate images from executable files. This may takes several seconds. Don't stop it while it is in progress. After post-build action is completed, the window would disappear automatically.



(4) After compile, the images km0_boot_all.bin and km0_image2_all.bin can be seen in **projects\realtek\amebaD\IAR\aws_tests\Debug\Exe\km0_image**.

2.2.2.2 Building KM4 Project

The following steps show how to build KM4 project:

(1) Open **projects\realtek\amebaD\IAR\aws_tests\Project_hp_release.eww**.

(2) Refer to 2.2.1 and choose the build configurations for each project according to your application.

(3) Click **Project** > **Options**, **General Options** > **Target** > **Processor Variant** > **Core**, verify the CPU configurations according to Fig 2-3.

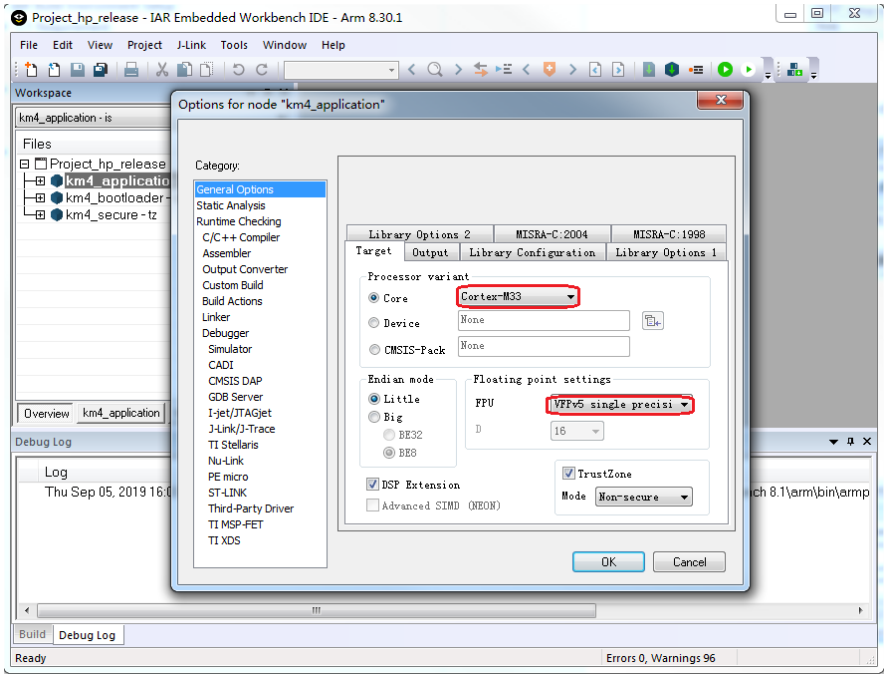


Fig 2-3 KM4 processor options

(4) Right click the project and choose "Rebuild All", as Fig 2-4 shows. The km4_bootloader, km4_application should compile in order.

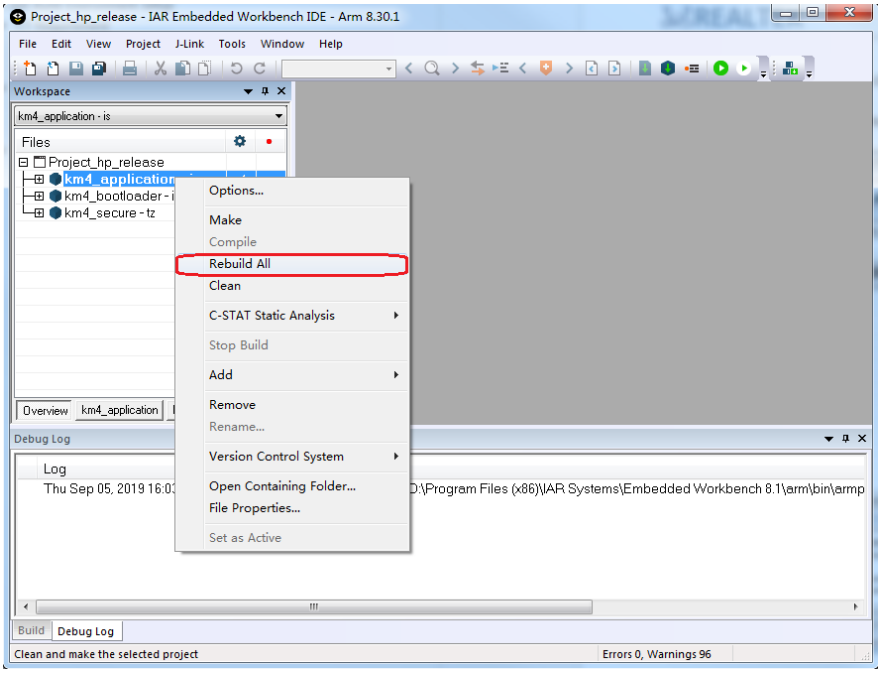
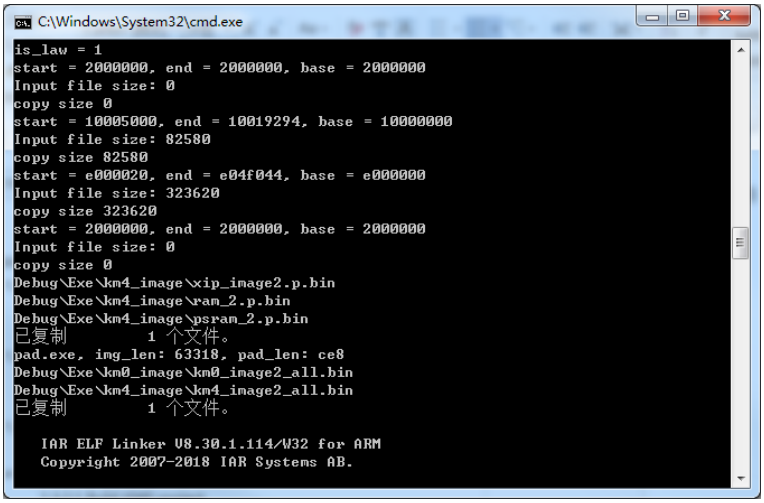


Fig 2-4 Building KM4 project

Note:

- After building each project, IAR will pop up a command prompt window shown in bellow to execute post-build action to generate images from executable files. This may takes several seconds. Don't stop it while it is in progress. After post-build action is completed, the window would disappear automatically.



(5) After compile, the images km4_boot_all.bin and km0_km4_image2.bin can be seen in **projects\realtek\amebaD\IAR\aws_tests\Debug\Exe\km4_image**.

(6) The generated images can be downloaded by ImageTool:

3 ImageTool

3.1 Introduction

This chapter introduces how to use ImageTool to encrypt, generate and download images. As show in Fig 3-1, ImageTool has four tabpages.

- Download: used as image download server to transmit images to Ameba through UART.

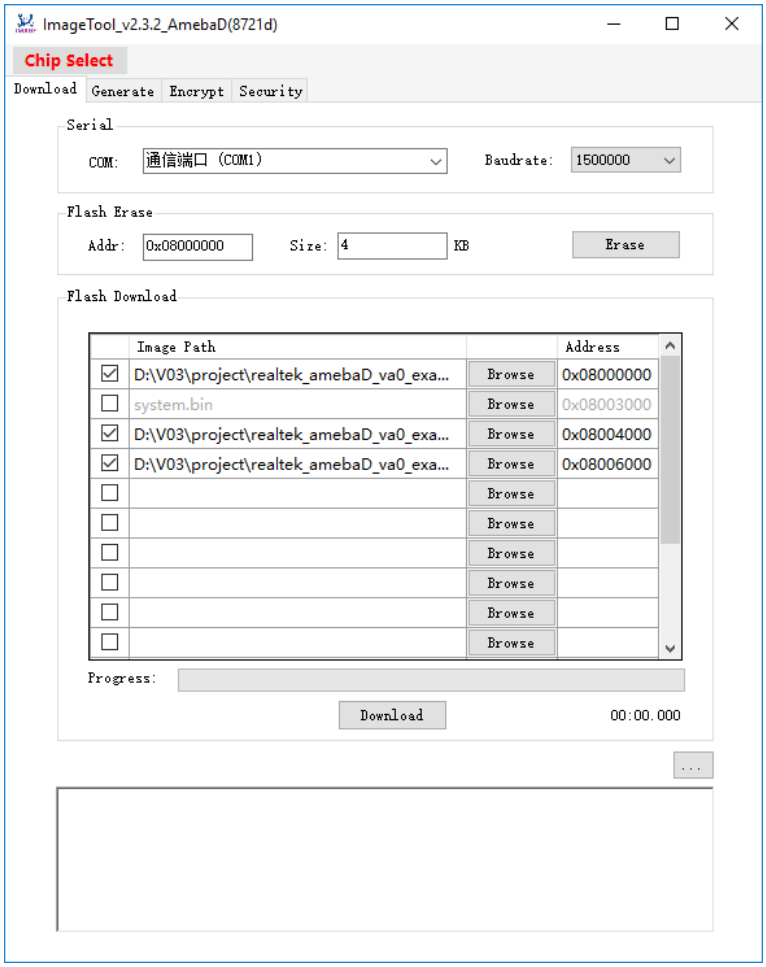


Fig 3-1 ImageTool UI

3.2 Environment Setup

3.2.1 Hardware Setup

The hardware setup is shown in Fig 3-2.

Note: If using external UART to download images, FT232 USB to UART dongle must be used.

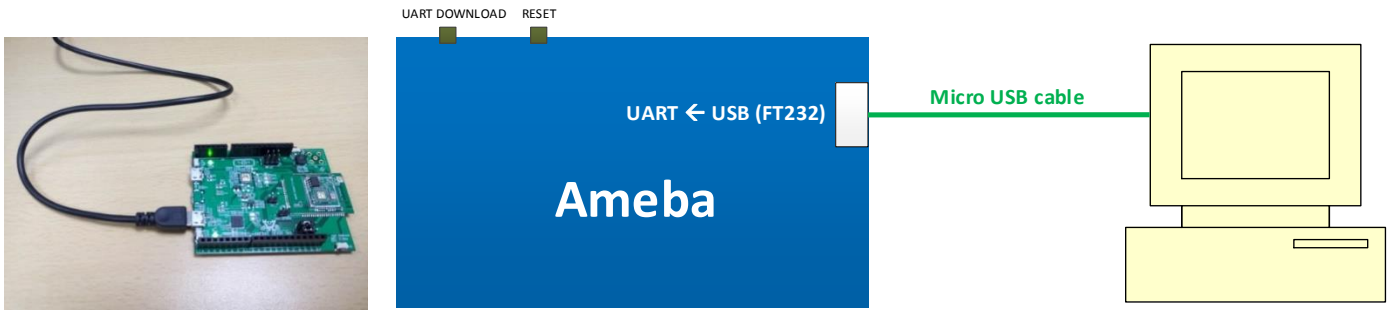


Fig 3-2 Hardware setup

3.2.2 Software Setup

- Environment Requirements: EX. WinXP, Win 7 Above, Microsoft .NET Framework 3.5
- ImageTool.exe Location: **vendors\realtek\tools\ameba-image-Tool-v2.4.1\ImageTool.exe**

Name	Date modified	Type	Size
ChangeLog.txt	7/29/2019 11:52 AM	Text Document	4 KB
Download.ini	11/4/2019 5:44 PM	Configuration sett...	2 KB
Encrypt.ini	11/4/2019 5:44 PM	Configuration sett...	1 KB
ImageTool.exe	7/29/2019 11:52 AM	Application	282 KB
ImageTool.pdb	7/29/2019 11:52 AM	VisualStudio.pdb....	178 KB
ImageTool.vshost.exe	8/20/2018 1:41 PM	Application	14 KB
ImageTool.vshost.exe.manifest	8/20/2018 1:41 PM	MANIFEST File	1 KB
imgtool_flashloader_amebad.bin	6/6/2019 3:15 PM	BIN File	5 KB
imgtool_flashloader_amebaz.bin	6/6/2019 3:15 PM	BIN File	6 KB
SB.exe	8/20/2018 1:41 PM	Application	189 KB
system.bin	8/6/2019 9:53 AM	BIN File	4 KB
TestListView.dll	8/20/2018 1:41 PM	Application extens...	5 KB
TestListView.pdb	8/20/2018 1:41 PM	VisualStudio.pdb....	14 KB

3.3 Download

3.3.1 Image Download

Assuming that the ImageTool on PC is a server, it sends images files to Ameba (client) through UART. There are two ways to download images to board.

3.3.1.1 Based on Hardware Reset

The way based on hardware reset is a manual method to download images, and it is the primary and recommended method.

(1) Enter into UART_DOWNLOAD mode.
   a) Push the **UART DOWNLOAD** button and keep it pressed.
   b) Re-power on the board or press the **Reset** button.
   c) Release the **UART DOWNLOAD** button.
   Now, Ameba board gets into UART_DOWNLOAD mode and is ready to receive data.

(2) Click **Chip Select** (in red) on UI and select chip (AmebaD).

(3) Select the corresponding serial port and transmission baud rate. The default baud rate is 1.5Mbps (recommended).

(4) Click the **Browse** button to select the images (**km0_boot_all.bin/km4_boot_all.bin/km0_km4_image2.bin**) to be programmed and input addresses.
   - The image path is located in **{*path*}\projects\realtek\amebaD\IAR\aws_tests\Debug\Exe\km0_image** and **{*path*}\projects\realtek\amebaD\IAR\aws_tests\Debug\Exe\km4_image**, where **{*path*}** is the location of the project on your own computer.
   - The default target address is the SDK default image address, you can use it directly.

(5) Click **Download** button to start. The progress bar will show the transmit progress of each image. You can also get the message of operation successfully or errors from the log window.

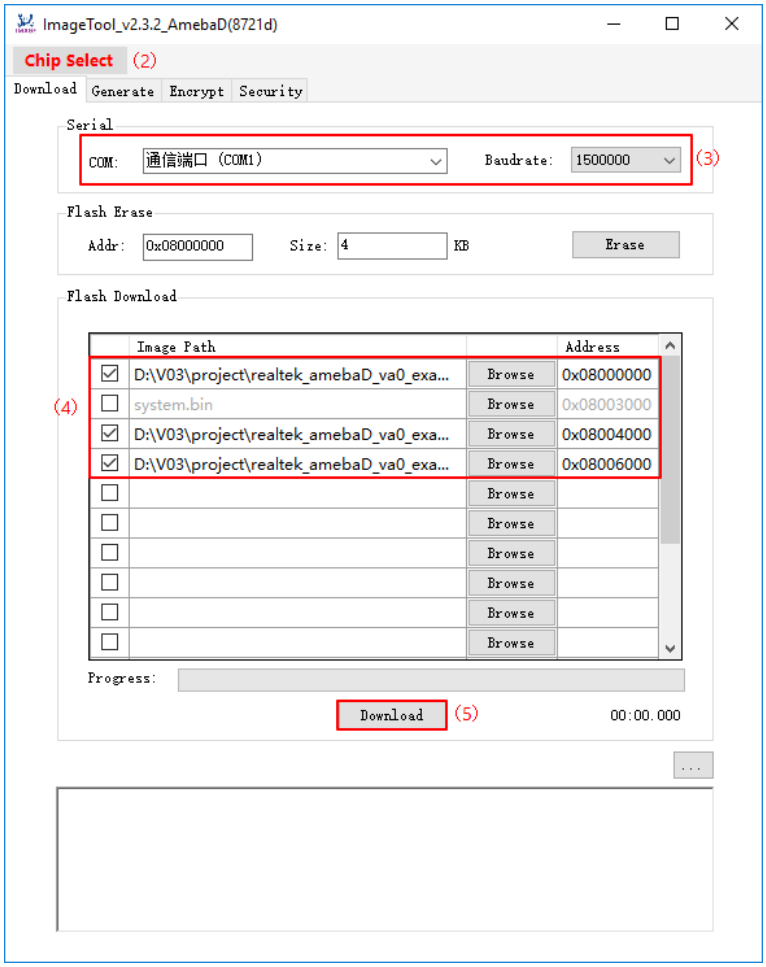


Fig 3-3 ImageTool 'Download' tabpage setting