Ameba-ZII Image PG Tool User Guide

This document introduces how to use Ameba-ZII Image PG Tool to download Images.

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USING THIS DOCUMENT

This document is intended for the software engineer's reference and provides detailed programming information.

Though every effort has been made to ensure that this document is current and accurate, **more information may have become available subsequent to the production of this guide.**

REVISION HISTORY

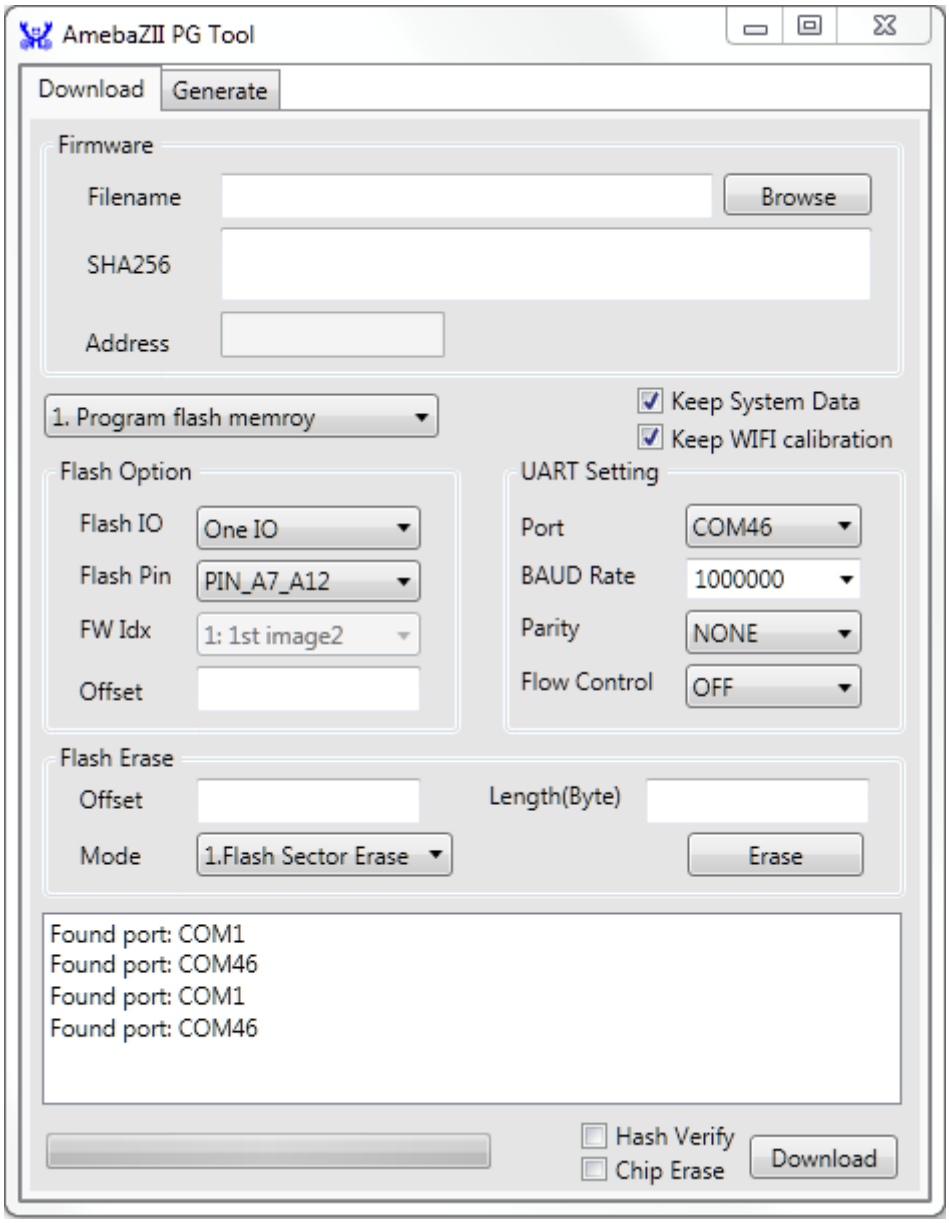
Revision	Release Date	Summary
0.1	2019/05/24	Initial draft
0.2	2019/06/13	Update CMD mode functions, flash chip erase
0.3	2019/06/28	Update CMD mode for flash sector erase; Update CMD mode for flash offset; Add Auto Download Mode; The Auto Download Mode enables download process at any states. AT command “ATXX” must be supported when running at normal state for activing the Auto Download Mode The Auto Download Mode supports by both UI and CMD mode. The update refer to AmebaZ2_PGTool version 1.0.7
0.4	2019/08/13	Add Image generation, which is available after version PG Tool 1.2.0

Table of Contents

1. Introduction

This document introduces how to use Image PG Tool to generate and download images. As show in following figure, Image PG Tool has two menu pages:

- Download: used as image download server to transmit images to Ameba through UART.
- Generate: contact individual images and generate a composite image.



2. Environment Setup

2.1. Hardware Setup

To download image, the following equipment is necessary:

- AmebaZII DEV
- micro USB cable
- USB FTDI cable (if need to download code via external UART)

  Please note that the USB FTDI cable **must use FT232 USB To UART dongle**.

The tool on PC sends images to AmebaZII through Log UART. The micro USB cable will both power the DEV and transmit data. If need to download code via external uart, micro USB cable only supply the power and USB FTDI cable transmits data. USB FTDI cable should connect to PA_15, PA_16 and GND.

2.2. Software Setup

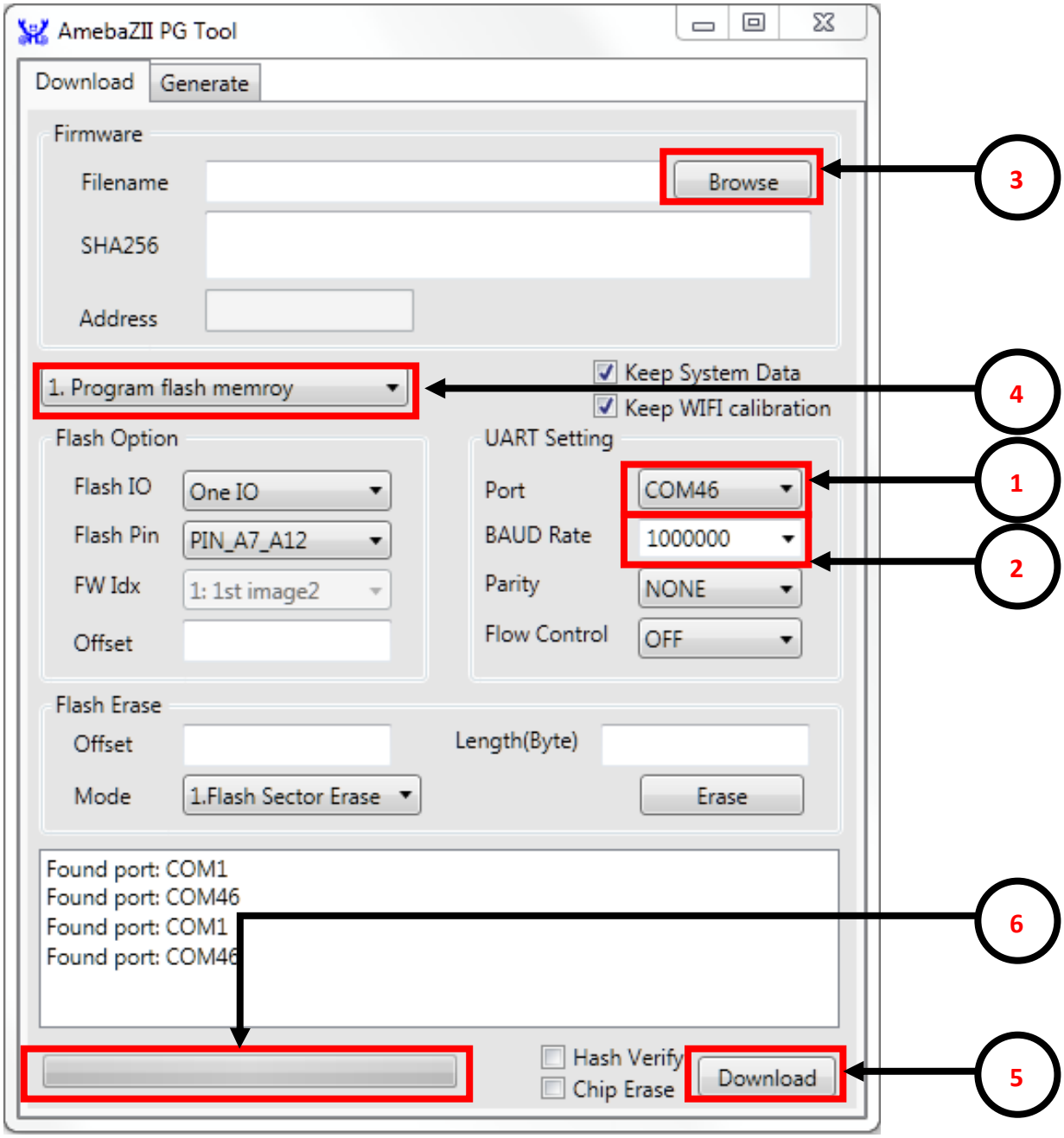
Environment Requirements:

- EX. WinXP, Win 7 or above
- Microsoft .NET Framework 3.5 or above

3. Image Download

3.1. Windows Form Mode

3.1.1. Quick start for full flash image burning



1) Application will scan available UART ports. Please choose correct **UART port**.

2) Choose desired **baud rate** between computer and AmebaZ2.

a) Use default value for parity and flow control.

3) Choose target flash binary image file "**flash_xx.bin**"

4) Check Mode is **1. Program flash memory**

5) Click **Download**, the tool will activated the Auto Download Mode for downloading process.

6) Progress will be shown on progress bar and result **OK/FAIL** will be shown after download finish.

NOTE:

- Other settings using default values,
- Flash IO : One IO / Flash Pin : PIN_A7_A12 / Parity : NONE / Flow Control : OFF

3.1.2. Function description

3.1.2.1 File selection, Hash verify, Chip erase

Click **Browse** button to select target flash image file, and it will calculate SHA256 hash verification word automatically.

To enable hash verification after downloading, Check **hash verify** at the bottom of application.

To enable chip erase before downloading, Check **chip erase** at the bottom of application.

3.1.2.2 Mode

There are 6 modes for Image PG Tool.

1) Program flash memory

   Programing full flash image, image file is selected by user from previous step.

   Target file name is **flash_xx.bin** that will be created after SDK project built.

2) Program flash image 1

   Programing bootloader image, target file name is **boot.bin**.

3) Update image 2

Programing firmware image, target file name is **firmware_xx.bin**.

User must select firmware target index by **FW Idx.**

4) Update image 2 auto

This is similar with option 3, but user does not need to select index. AmebaZ2 will choose partition that content older version to update firmware automatically.

5) Program RAM

This is a RESERVED mode for internal use.

6) UART boot with a FW image

This is a RESERVED mode for internal use.

3.1.2.3 Flash Option

1) Flash IO

Please use **One IO** if not sure.

2) Flash Pin

Choose correct “Flash Pin” according to the IC part number.

Flash Pin	IC part number
PIN_A7_A12	RTL8710CX/RTL8720CM
PIN_B6_B12	RTL8720CF

3) FW Idx

Select firmware partition when using **Mode 3.**

4) Offset

Offset address on the Flash.

3.1.2.4 UART setting

1) Port

Application will scan all available port on computer. Please check port number is match corresponding hardware.

2) BAUD Rate/Parity/Flow control

Normal UART configuration, please check UART spec.

Please use **Parity: NONE** and **Flow Control: OFF** if not sure

Initial UART property is **115200 8-N-1** for setup stage**,** after download start UART will be reconfigured to user defined baud rate.

3.1.2.5 Setting file

When logging out PG Tool, current settings will be save in setting.xml file under the same path.

When logging in PG Tool, it will load the setting.xml file first to recover the settings of last time.

The default value of UART timeout is 2 seconds, this value can be customize in setting.xml file.

3.2. Command Line Mode

The tool can also work in command line mode. Start cmd.exe in windows and execute Ameba-ZII PG Tool AmebaZ2_PGTool.exe with defined parameters.

The supported parameters can be achieved by type "**-help**" as follows,

```
$ AmebaZ2_PGTool.exe -help
```

```
usage:
    -show [device|setting]
        E.g. -show device
    -set image <path>
        E.g. -set image D:\test\flash_is.bin
    -set mode <mode number>
            <mode number> 0 : Program flash memory
            <mode number> 1 : Program flash Image 1
            <mode number> 2 : Update image 2
            <mode number> 3 : Update image 2 auto
            <mode number> 4 : Program RAM
            <mode number> 5 : UART boot with a FW image
        E.g. -set mode 0
    -set flash_io <flash_io options>
            <flash_io options> 0 : One_IO
            <flash_io options> 1 : Dual Output
            <flash_io options> 2 : Dual IO
            <flash_io options> 3 : Quad Output
            <flash_io options> 4 : Quad IO
            <flash_io options> 5 : QPI
        E.g. -set flash_io 0
    -set flash_pin <flash_pin options>
            <flash_pin options> 0 : PIN_A7_A12
            <flash_pin options> 1 : PIN_B6_B12
            <flash_pin options> 2 : PIN_A15_A20
        E.g. -set flash_pin 0
    -set flash_offset <offset address>
        E.g. -set flash_offset 0x00000000
    -scan device
    -add device <device>
        E.g. -add device COM1
    -erase [sector <offect> <length(byte)> | chip]
        E.g. -erase sector 0x00000000 0x00000000
        E.g. -erase chip
    -download
```

3.2.1. Devices Connections

You can use "**-scan device"** parameter to check serial ports connected to PC as follows,

$ AmebaZ2_PGTool.exe -scan device

```
    Found port: COM1
    Found port: COM8
    Device scan done
    Available device port:    COM1
    Available device port:    COM8
```

You can use "**-add device**" to connect device port for download, and "**-show device**" to list the specified device names.

$ AmebaZ2_PGTool.exe -add device COM8

$ AmebaZ2_PGTool.exe -show device

```
    Device added: COM8
```

```
CMD_download_device
 Added device:     COM8
```

3.2.2. Configuration

- To check the tool configuration, you can use "**-show setting**" as parameters.

$ AmebaZ2_PGTool.exe -show setting

```
CMD_download_setting
 Image file path:  d:\flash\flash_is_crypto.bin
 Mode:             Program flash memory
 Flash IO:         One IO
 Flash Pin:        PIN_A7_A12
```

- To choose file to download, you can use "**-set image <path>**" as parameters.

$ AmebaZ2_PGTool.exe -set image D:\flash\flash_is_crypto.bin

```
File path: d:\flash\flash_is_crypto.bin
File length: 104256
```

- To choose mode to download, you can use "**-set mode <mode number>**" as parameters.

$ AmebaZ2_PGTool.exe -set mode 0

```
Mode selection: Program flash memory
```

- To choose flash_io to download, you can use "**-set flash_io <flash_io options>**" as parameters.

$ AmebaZ2_PGTool.exe -set flash_io 0

```
Flash IO selection: One IO
```

- To choose flash_pin to download, you can use "**-set flash_pin <flash_pin options>**" as parameters. (Please refer to section ***3.1.2.3 Flash*** Option for more information.)

$ AmebaZ2_PGTool.exe -set flash_pin 0

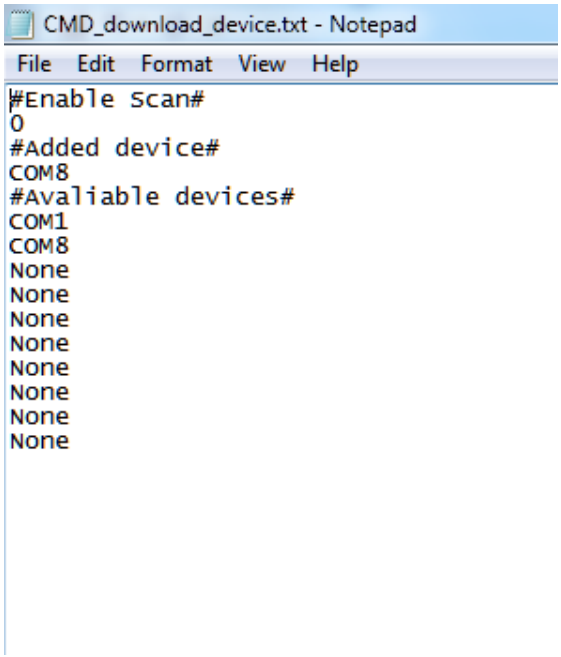
```
Flash pins seletion: PIN_A7_A12
```

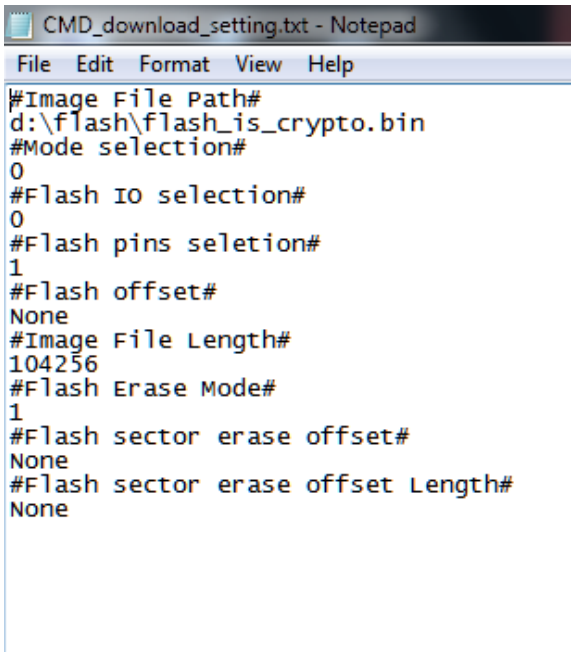
- To set the downloading start address of the flash, you can use "**-set flash_offset <offset address>**".

$ AmebaZ2_PGTool.exe -set flash_offset 0x00000000

```
Mode: Program flash memory
Flash offset: 0x00000000
```

- In addition, you can manually configure "**CMD_download_device.txt**" and "**CMD_download_setting.txt**" for download configuration. Please note that the default support maximum UART ports connection is 10.





3.2.3. Flash Erase

In order to successful apply the flash erase function, please enter the PG mode before apply any command.

- Please hold the UART download button and presses reset button to let the board enter the PG mode. (Please refer to ***AN0500 Realtek Ameba-ZII application note.en***)

3.2.3.1 Flash Sector Erase

You can use "**-erase sector <offset> <length (byte)>**" to erase sectors of flash for target device. **<offset>** is to set the start address of the flash. **<length (byte)>** is to set the length of the erase area. Note that a sector is 4K bytes, the length should be Integer multiple of the 4K bytes.

$ AmebaZ2_PGTool.exe -erase sector 0x00000000 0x00000000

```
Flash Sector Erase offset: 0x00000000
Flash Sector Erase length: 0x00000000
Start   Flash Sector Erase
Found port: COM1
Found port: COM9
Disconnect
ERASE: Success
End   Flash Sector Erase
```

3.2.3.2 Flash Chip Erase

You can use "**-erase chip**" to erase flash chip for target device.

$ AmebaZ2_PGTool.exe -erase chip

```
Start   Flash Chip Erase
Found port: COM1
Found port: COM8
Disconnect
ERASE: Success
End   Flash Chip Erase
```

3.2.4. Download image

After all configuration is finished, you can use "**-download**" to download image for target device. "-download" enables the Auto Download Mode for downloading process.

- Please hold the UART download button and presses reset button to let the board enter the PG mode. (Please refer to ***AN0500 Realtek Ameba-ZII application note.en***)
- Auto Download Mode is supported, user may not necessary to enter the PG mode.

$ AmebaZ2_PGTool.exe -download

```
Start   Download
Found port: COM1
Found port: COM9
PG: start
Downloading --- %1
Downloading --- %1
Downloading --- %1
Downloading --- %1
Downloading --- %1
Downloading --- %1
Downloading --- %1
Downloading --- %1
Downloading --- %1
Downloading --- %1
Downloading --- %4
Downloading --- %10
Downloading --- %16
Downloading --- %20
Downloading --- %23
Downloading --- %26
Downloading --- %29
Downloading --- %35
Downloading --- %40
Downloading --- %47
Downloading --- %52
Downloading --- %57
Downloading --- %63
Downloading --- %67
Downloading --- %69
Downloading --- %72
Downloading --- %75
Downloading --- %79
Downloading --- %83
Downloading --- %87
Downloading --- %91
Downloading --- %92
Downloading --- %95
Downloading --- %99
Downloading --- %100
WORKER: complete
End   Download
```

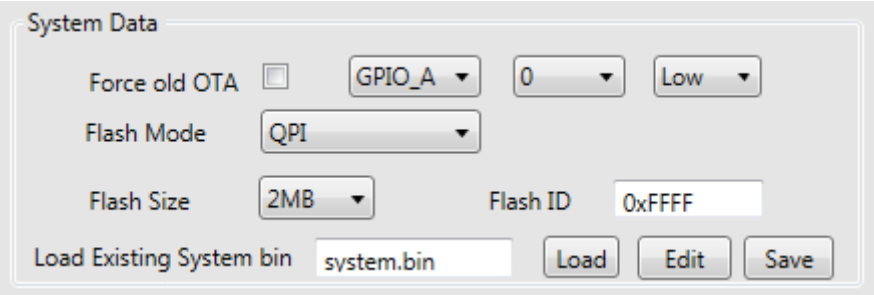
4. Image Generation

The Generate tab page has two functions:

- Generate binary for system data section
- Concat separate images and generate a final image named flash.bin

4.1. System data generation

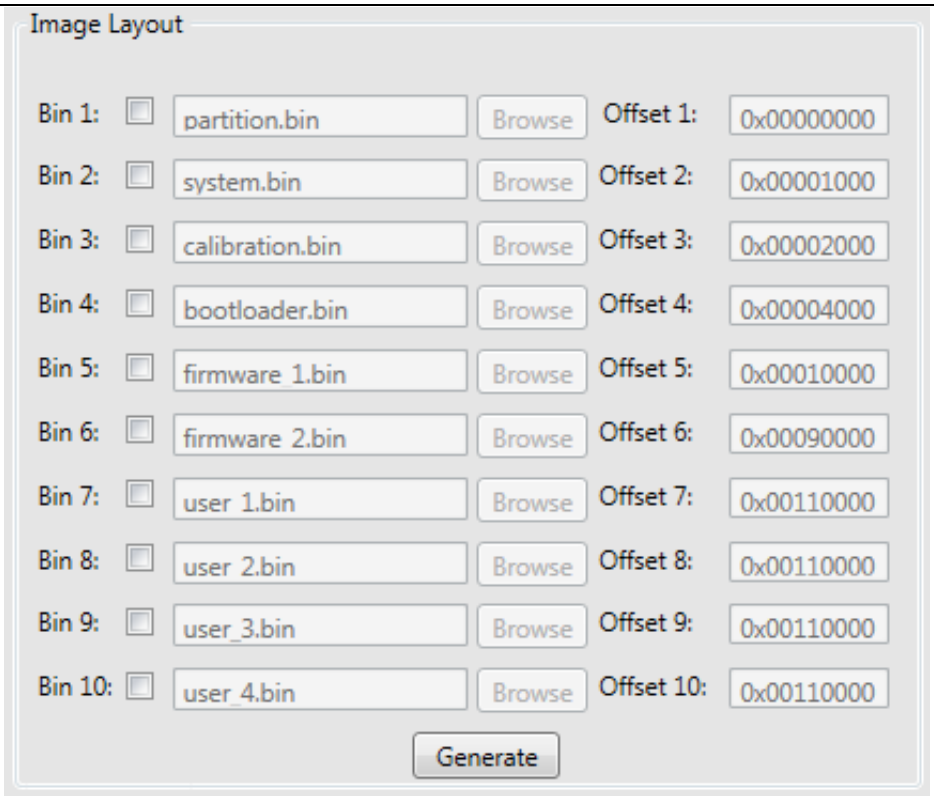
User can “Load” an existing binary file and “Edit” accordingly. After edit, system data can be saved to system.bin in tool directory after click “Save” button. You will see the introduction of each configuration in system data in AN0500 Realtek Ameba-ZII application note.en.



Note: Don’t modify the system data unless it’s necessary.

4.2. Flash image generation

User can select images to be concated and input corresponding address. The memory layout can refer to AN0500 Realtek Ameba-ZII application note.en and the address can be found in partition.json which locates in project\realtek_amebaz2_v0_example\EWARM-RELEASE and project\realtek_amebaz2_v0_example\GCC-RELEASE.



4.2.1. How to concat a normal image and a MP image

Below are the simple steps of how to use PG Tool to concat a normal image and a MP image and switch between them during MP process.

- Check “Bin 5”, “Browse” for the normal image “flash_is.bin” generated by IAR/GCC project. (Note that flash_is.bin includes already partition.bin, bootloader.bin & firmware_1.bin)
- Set “Offset 5” to “0x0”
- Check “Bin 6”, “Browse” for the MP image “firmware_is.bin” generated by IAR/GCC project. (Note that firmware_is.bin includes only firmware_1.bin or firmware_2.bin)
- Set “Offset 6” to “0x90000” which is the default address for “firmware_2” in SDK.
- “Generate” to save the output image “flash.bin”
- Go back to the “Download” sub tab to download flash.bin
- Reboot the chip and use ATSR/ATSC to switch between normal image and mp image

5. Trouble Shooting

TBD