
AVR32827: How to Migrate from ASF 1.7 to ASF 2.x



Features

- List of major changes between ASF 1.7 and ASF 2.x
- Migration notes for a transition from Atmel® AVR32 Studio 2.6 to Atmel AVR Studio® 5
- Migration notes for AVR32 Studio 2.6 for a transition from ASF 1.7 to ASF 2.x
- Migration notes for IAR™ EWAVR32 for a transition from ASF 1.7 to ASF 2.x

1 Introduction

The Atmel AVR® Software Framework (ASF) has had a major update from version 1.7 to version 2.0 and higher (hereunder referenced as ASF 2.x), the most outstanding change being the addition of Atmel AVR XMEGA® support. This application note, which is meant for pre-ASF 2.x AVR UC3 users, lists the main changes between these two revisions, and pinpoints the items that must be carefully considered when migrating to the latest revision.

Together with this major update, the new Atmel AVR Studio 5 integrated development environment (IDE) has been released. This IDE supports both Atmel AVR UC3 and AVR XMEGA devices. It integrates the ASF starting at version 2.x, and offers the same ASF functionalities as AVR32 Studio. This application note also addresses the topic of migrating existing AVR32 Studio ASF source code to AVR Studio 5.

For AVR32 Studio or IAR users, this application note also mentions what to do to migrate to ASF 2.x.

32-bit **AVR**®
Microcontrollers

Application Note

Rev. 32161A-AVR-02/11





2 Major changes in ASF 2.x

ASF 2.x is a major update of the Atmel AVR Software Framework. Note that all existing AVR32 software modules supported in ASF 1.7 have been kept in ASF 2.x. However, a few changes may have an impact when migrating to ASF 2.x.

[Table 2-1](#) lists the main changes and the impact each could have on an ASF 1.7 to ASF 2.x migration effort.

Table 2-1. Major changes between ASF 1.7 and ASF 2.x and their impact on a migration to ASF 2.x.

Changes	Impact on a Migration to ASF 2.x
Add AVR XMEGA support. To accommodate this introduction and to streamline the common source code, a top-level directory structure has been added, which consists of four directories: avr32/, common/, thirdparty/, xmega/	All existing ASF 1.7 source code has been split into the following folders in ASF 2.x: • avr32/ • common/ • thirdparty/ <u>Impact when migrating an existing ASF 1.7-based project to ASF 2.x:</u> To benefit from the updates in the ASF software modules, consider that all ASF file paths have been changed in ASF 2.x.
Casing of directory names changed from uppercase to lowercase (to streamline the usage of ASF between case-sensitive systems (for example, Linux®) and non-case-sensitive systems (for example, Windows®))	All directories in ASF 1.7 were uppercase; in ASF 2.x, the names haven't changed, but they are now lowercase. <u>Impact when migrating an existing ASF 1.7-based project to ASF 2.x:</u> To benefit from the updates in the ASF software modules on case-sensitive systems, consider that all ASF files paths have been changed in ASF 2.x.
Introduction of a new USB stack under the common/ folder	• The low-level USBB software drivers compatible with the old USB stack have been moved from DRIVERS/USBB to avr32/drivers/usbb/_asf_v1/ • The old USB stack has been moved from SERVICES/USB/ to avr32/services/usb/_asf_v1/ <u>Impact when migrating an existing ASF 1.7-based project to ASF 2.x:</u> To benefit from the updates to the previous ASF USB stack, consider that all previous USB stack ASF file paths have been changed in ASF 2.x.
A top-level thirdparty/ folder has been added. The goal of this folder is to separate Atmel ASF licensed software from other types of licenses. Several modules that used to be under the SERVICES and COMPONENTS folders have been moved to the third-party folder	The following modules have been moved outside of the avr32 directory tree to the third-party folder: • from SERVICES/FREERTOS to thirdparty/freertos • from SERVICES/MEMORY/MEMORY_MANAGER/DLMALLOC to thirdparty/dlmalloc • from COMPONENTS/WIFI/HD to thirdparty/hd • from SERVICES/PICTURES/JPG/IJG to thirdparty/ijg • from SERVICES/LWIP to thirdparty/lwip • from UTILS/NEWLIB_ADDONS to thirdparty/newlib_addons • from UTILS/LIBS/NEWLIB_ADDONS to thirdparty/newlib_addons/libs • from SERVICES/POLARSSL to thirdparty/polarssl <u>Impact when migrating an existing ASF 1.7-based project to ASF 2.x:</u> To benefit from the updates in these ASF software modules, consider that the file paths of these modules have changed in ASF 2.x.
The avr32/utls/compiler.h file now has a dependency on a new file: common/utls/interrupt.h	<u>Impact when migrating an existing ASF 1.7-based project to ASF 2.x:</u> The interrupts.h file as well as the interrupt_avr32.h file located under common/utls/interrupt/ must be imported to the existing project. Import of the intc software driver thus becomes necessary, too, because the interrupt_avr32.h file refers to the intc software driver.

Changes	Impact on a Migration to ASF 2.x
The board.h file supports both AVR UC3 and AVR XMEGA boards. For this reason, it has been moved to the common/ folder	The board.h file that used to be in BOARDS/ has been moved to common/boards/ <u>Impact when migrating an existing ASF 1.7-based project to ASF 2.x:</u> To benefit from the updates in this file, consider that this file location has changed in ASF 2.x.
The AVR UC3 example of a crt0.S startup file has been moved and renamed	The AVR UC3 example of a crt0.S startup file has been moved and renamed from UTILS/STARTUP_FILES/GCC/crt0.S to avr32/utls/startup/startup_uc3.S. <u>Impact when migrating an existing ASF 1.7-based project to ASF 2.x:</u> To benefit from the updates in this file, replace crt0.S with startup_uc3.S.
The boot loader-related files trampoline.S and trampoline.s82 have been moved and renamed	The files trampoline.S and trampoline.s82 under SERVICES/USB/CLASS/DFU/EXAMPLES/ISP/BOOT/ have been moved to avr32/utls/startup/ and renamed trampoline_uc3.S and trampoline_uc3.s82, respectively. <u>Impact when migrating an existing ASF 1.7-based project to ASF 2.x:</u> To benefit from the updates in these files, replace trampoline.S and trampoline.s82 with trampoline_uc3.S and trampoline_uc3.s82, respectively.
The ecc_hamming software module has been moved	The ecc_hamming software module has been moved from SERVICES/MEMORY/ECC_HAMMING/ to avr32/services/storage/ecc_hamming/. <u>Impact when migrating an existing ASF 1.7-based project to ASF 2.x:</u> To benefit from the updates in the ecc_hamming software module, consider that this module location has changed in ASF 2.x.
The dsplib software module has been moved	The dsplib software module has been moved from SERVICES/DSPLIB/ to avr32/services/dsp/dsplib/. <u>Impact when migrating an existing ASF 1.7-based project to ASF 2.x:</u> To benefit from the updates in the dsplib software module, projects using it should consider that its location has changed in ASF 2.x.
The auto baud software module has been deprecated and replaced by the freq_detect software module	The auto baud software module has been deprecated. The freq_detect software module under avr32/services/freq_detect/ should be used instead. <u>Impact when migrating an existing ASF 1.7-based project to ASF 2.x:</u> To benefit from the improvements brought by the freq_detect software module, projects using the auto baud software module must switch to the freq_detect software module.
The FAT software module has been moved	The FAT software module has been moved from SERVICES/FAT/ to avr32/services/fs/fat/. <u>Impact when migrating an existing ASF 1.7-based project to ASF 2.x:</u> To benefit from the updates in the FAT software module, consider that this module location has changed in ASF 2.x.
The EVK1104-DEMO application has been moved and renamed	The EVK1104-DEMO application under APPLICATIONS/EVK1104-DEMO has been moved and renamed to avr32/applications/evk1104-usb-misc-sd-demo. <u>Impact when migrating an existing ASF 1.7-based project based on this application to ASF 2.x:</u> To benefit from the updates in this demo, create a new application using evk1104-usb-misc-sd-demo, and carefully merge the existing legacy source code to this new project.



Changes	Impact on a Migration to ASF 2.x
The EVK1104-EVK1105-DSPLIB-DEMO application has been moved and renamed	The EVK1104-EVK1105-DSPLIB-DEMO application under APPLICATIONS/EVK1104-EVK1105-DSPLIB-DEMO has been moved and renamed to avr32/applications/uc3-dsplib-demo. <u>Impact when migrating an existing ASF 1.7-based project based on this application to ASF 2.x:</u> To benefit from the updates in this demo, create a new application uc3-dsplib-demo, and merge the existing legacy source code to this new project.
The AT32UC3C_EK_CAN_LIN_LOOPBACKS_DEMO application has been moved and renamed	The AT32UC3C_EK_CAN_LIN_LOOPBACKS_DEMO application under APPLICATIONS/AT32UC3C_EK_CAN_LIN_LOOPBACKS_DEMO has been moved and renamed to avr32/applications/uc3c_ek-can-lin-loopbacks-demo. <u>Impact when migrating an existing ASF 1.7-based project based on this application to ASF 2.x:</u> To benefit from the updates in this demo, create a new application using uc3c_ek-can-lin-loopbacks-demo, and merge the existing legacy source code to this new project.
The AVR32_UC3 application under the FreeRTOS module has been moved and renamed	The AVR32_UC3 application under SERVICES/FREERTOS/Demo/AVR32_UC3 has been moved and renamed to thirdparty/freertos/demo/avr32_uc3_example. <u>Impact when migrating an existing ASF 1.7-based project based on this application to ASF 2.x:</u> To benefit from the updates in this demo, create a new application using avr32_uc3_example, and merge the existing legacy source code to this new project.
The lwIP_AVR32_UC3 application under the FreeRTOS module has been moved and renamed	The lwIP_AVR32_UC3 application under SERVICES/FREERTOS/Demo/lwIP_AVR32_UC3 has been moved and renamed to thirdparty/freertos/demo/lwip_avr32_uc3_example. <u>Impact when migrating an existing ASF 1.7-based project based on this application to ASF 2.x:</u> To benefit from the updates in this demo, create a new application using lwip_avr32_uc3_example, and merge the existing legacy source code to this new project.
The lwIP_AVR32_UC3_DHCP application under the FreeRTOS module has been moved and renamed	The lwIP_AVR32_UC3_DHCP application under SERVICES/FREERTOS/Demo/lwIP_AVR32_UC3_DHCP has been moved and renamed to thirdparty/freertos/demo/lwip_avr32_uc3_dhcp_example. <u>Impact when migrating an existing ASF 1.7-based project based on this application to ASF 2.x:</u> To benefit from the updates in this demo, create a new application using lwip_avr32_uc3_dhcp_example, and merge the existing legacy source code to this new project.

3 Migrating ASF 1.7-based projects in AVR32 Studio to ASF 2.x-based projects in AVR Studio 5

Atmel AVR32 Studio includes support for the Atmel AVR Software Framework up to version 1.7. AVR Studio 5 includes support for AVR Software Framework from version 2.x on.

Projects created with AVR32 Studio are not compatible with AVR Studio 5.

NOTE

There is no "Import from AVR32 Studio" feature in AVR Studio 5.0 (but there may be in subsequent revisions).

Conclusion: To migrate an ASF 1.7-based project in AVR32 Studio to an ASF 2.x-based project in AVR Studio 5, do the following:

- Create a new project in AVR Studio 5
- Using the ASF 2.x wizard in AVR Studio 5, add the ASF modules that are used by the project to be migrated
- Carefully merge the ASF legacy code from the ASF 1.7-based project to the ASF 2.x files added in the previous step. Use Chapter 2 of this document and the ASF 2.x Release Note to get a view of all changes
- Add non-ASF legacy source files from the ASF 1.7-based project to the new AVR Studio 5 project

NOTE

Refer to the AVR Studio 5 help documentation and the ASF help documentation embedded in AVR Studio 5 to get started.



4 Migrating ASF 1.7-based projects to ASF 2.x-based projects in AVR32 Studio

Atmel AVR32 Studio includes support for the Atmel AVR Software Framework up to version 1.7. However, a standalone ASF 2.x zip package can be downloaded from the web and used in AVR32 Studio projects. This zip package contains gcc projects for all examples and applications in the form of makefile and config.mk files. These project files can be used by AVR32 Studio to create projects (refer to AVR32 Studio documentation and related application notes for details).

NOTE

A project using the ASF 2.x zip package should not use the AVR32 Studio Software Framework wizard because it only supports ASF 1.7. In other words, AVR32 Studio only recognizes the ASF structure up to version 1.7 and cannot correlate it with the directory structure of ASF version 2.x.

Conclusion: To migrate an ASF 1.7-based project to an ASF 2.x-based project in AVR32 Studio, do the following:

- Create a new project in AVR32 Studio:
 - o Use the built-in AVR32 Studio builder (cf. application note AVR32015: AVR32 Studio getting started)
 - o Or use the standalone GCC makefile (cf. application note AVR32769: How to Compile the Standalone AVR UC3 Software Framework in AVR32 Studio V2)
- Import the standalone ASF 2.x zip package into the new project
- Carefully merge the ASF legacy code from the ASF 1.7-based project to the ASF 2.x files added in the previous step. Use Chapter 2 of this document and the ASF 2.x Release Note to get a view of all changes
- Add non-ASF legacy source files from the ASF 1.7-based project to the new AVR32 Studio project

NOTE

AVR32 Studio projects using the ASF 2.x standalone zip package must not use the ASF wizard menu.

5 Migrating ASF 1.7-based IAR projects to ASF 2.x-based IAR projects

IAR Embedded Workbench® for Atmel 32-bit AVR doesn't include any ASF-specific support. However, all examples and applications in the ASF 2.x standalone zip package include IAR projects, as was the case for the ASF 1.7 standalone zip package.

NOTE

For a given example or application available in both ASF 1.7 and ASF 2.x, an ASF 2.x-based IAR project is not compatible with an ASF 1.7-based IAR project due to the major changes in ASF 2.x (as described in Chapter 2 of this document).

Conclusion: To migrate an ASF 1.7-based IAR project to an ASF 2.x-based IAR project, do the following:

- Create a new IAR project
- Manually import the ASF 2.x software modules required by the ASF 1.7-based project
- Carefully merge the ASF legacy code from the ASF 1.7-based project to the ASF 2.x files added in the previous step. Use Chapter 2 of this document and the ASF 2.x Release Note to get a view of all changes
- Add non-ASF legacy source files from the ASF 1.7-based project to the new IAR project





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