
AVR32018: How to upgrade from GNU Toolchain 2.0.3 to 2.1.5 or later

1 Introduction

The AVR[®]32 GNU Toolchain v2.1.5 and the corresponding AVR32 Studio 2.1 introduce incompatibility with the previous revision GNU Toolchain 2.0.3 and AVR32 Studio 2.0.

This document outlines the software operations to migrate from a GNU Toolchain 2.0.3 to 2.1.5 or later.



**32-bit AVR[®]
Microcontrollers**

Application Note

Rev. 32118A-AVR32-03/09





2 GNU Toolchain Software Migration

2.1 Description of the Migration

2.1.1 Newlib

The Newlib C library included in the Toolchain has been updated: some features have been removed. In order to maintain compatibility with older projects, these functions have been added as a library called Newlib Addons in the Software Framework.

This update leads to compile errors like:

```
No such file or directory
    sys/cpu.h
    sys/usart.h
Warning: implicit declaration of function 'set_cpu_hz'
```

The CPU exceptions are not automatically registered by the Newlib anymore.

2.1.2 Linker

The GNU Toolchain linker has been upgraded and the linker script provided in the AVR32 Software Framework needs to be upgraded too.

2.2 Fix/Workaround

There are two possible fixes:

2.2.1 Use the newest Software Framework

- a. If the old project is an unmodified Software Framework Example, delete it and re-create the corresponding one using AVR32 Studio 2.1 menu File -> New -> Examples...
- b. If the old project has been modified, use the AVR32 Studio menu -> Framework -> Select Drivers/Components/Services and go through the sections: in the (3/3) Select Services section -> Newlib Addons: select the library.

When clicking on "Finish", the wizard will ask for imported software framework files update:

- If you do not want to upgrade the software framework files, select "no" to all the pop-ups.
- If you want to upgrade the software framework files, select "yes" to all the pop-ups (WARNING: all the software framework modified files will be overwritten).

Note the AVR32 Studio 2.1 already includes the latest versions of the software framework:

AVR32 Studio 2.0 and GNU Toolchain 2.0.3

- => AVR32 Software Framework UC3A 1.2.1ES
- => AVR32 Software Framework UC3B 1.2.1ES
- => AVR32 Software Framework UC3A 1.3.0
- => AVR32 Software Framework UC3B 1.3.0

AVR32 Studio 2.1 and GNU Toolchain 2.1.4

- => AVR32 Software Framework UC3A 1.2.2ES

=> AVR32 Software Framework UC3B 1.2.2ES
=> AVR32 Software Framework UC3A 1.4.0
=> AVR32 Software Framework UC3B 1.4.0
=> AVR32 Software Framework AP7000 1.0.0

2.2.2 If you do not want to upgrade the Software Framework files used in the old projects

Do the following steps:

a. For Newlib-based projects, add the Newlib Addons library to the project:
Go through AVR32 Studio menu -> Framework -> Select Drivers/Components/Services and go through the sections: in the (3/3) Select Services section -> Newlib Addons: select the library. When clicking on Finish on the last section, say "no" when asking to update the old files.

The old files which included the followings includes:

```
#include <sys/cpu.h>
#include <sys/exceptions.h>
#include <sys/interrupts.h>
#include <sys/io.h>
#include <sys/usart.h>
```

Should be replaced with

```
#include "nlao_cpu.h"
#include "nlao_exceptions.h"
#include "nlao_interrupts.h"
#include "nlao_io.h"
#include "nlao_usart.h"
```

You can see the project options changes by editing the project properties -> C/C++ Build -> Settings -> AVR32/GNU C Linker -> Libraries.

Note that the Newlib Addons libraries are located in the directory UTILS\LIBS\NEWLIB_ADDONS\AT32x.

b. Use the latest Software Framework linker script from the zip Linker_Script_140.zip and extract it to the software framework location in \UTILS\LINKER_SCRIPTS.

3 AVR32 Studio Software Migration

The AVR32 Studio 2.1 now supports the .S assembly files. If any existing projects previously created with AVR32 Studio 2.0 based on the software framework were using duplicate .x and .S extension files in the same directory, the two files will be considered for compilation and thus generate an error at link time.

To fix this:

- Go into the folder src/DRIVERS/INTC/ and make sure you keep only one of the .x or .S file (exception.x or exception.S),
- Go into src/SERVICES/USB/CLASS/DFU/EXAMPLES/ISP/BOOT and make sure you keep only one of the .x or .S file (trampoline.x or trampoline.S)



4 Suggested reading

4.1 GNU Toolchain Release Note

http://www.atmel.com/dyn/products/tools_card.asp?tool_id=4118

4.2 AVR32 Studio Release Note

http://www.atmel.com/dyn/products/tools_card.asp?tool_id=4116



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