How to Upgrade an AT91 EB01 Evaluation Board to an AT91 EB40

AT91 ARM® Thumb® Microcontrollers

Application Note

The AT91M40400 and AT91R40807 are members of the Atmel, 16-/32-bit microcontroller family which is based on the ARM7TDMI™ processor core. The main difference between the AT91M40400 and the AT91R40807 is the AT91R40807 offers 1-Mbit additional high-speed SRAM.

The following paragraphs outline the hardware and software operations to perform when a user wants to upgrade an AT91M40400-based EB01 Evaluation Board to an AT91R40807-based EB40 Evaluation Board.

Hardware Requirements

Microcontroller Replacement

The user must first replace the microcontroller IC. The AT91M40400 and the AT91R40807 are pin-to-pin compatible and both are packaged in 100-lead TQFP packages. The user needs to solder the AT91R40807 in place of the AT91M40400.

Software Requirements

Software Package

Atmel's Evaluation Boards are provided with a boot program which features Functional Test Software (FTS), Angel Debug Monitor (ADM) and a default user application.

Boot Program and Functional Test Software

The AT91R40807 includes additional SRAM and more power-saving features and capabilities than the AT91M40400. The only difference between the boot programs for an EB01 Evaluation Board and an EB40 Evaluation Board is the deactivation of all the peripheral-clocks on the AT91R40807. The boot program and the Functional Test Software must be upgraded.

Angel Debug Monitor

The Angel Debug Monitor stored in the on-board Flash on an EB01 Evaluation Board can run on an EB40 Evaluation Board. Nevertheless, the difference between the Angel Debug Monitors (for both Evaluation Boards) is the banner which indicates the version of Angel and the boot program version.

Note: This information is accessible through a debugger session. The Angel Debug Monitor must be upgraded.

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Default User Application

The default user application is also different, therefore, it must be upgraded. The AT91M40400 and the AT91R40807 have the same ARM7TDMI core. Most programs written and compiled for an EB01 Evaluation Board can be run on an EB40 Evaluation Board, however, it is necessary to display caution with the activation and deactivation of each peripheral clock, especially at start up.

Required Files for Upgrade

The user must have the following binary image files:

- boot_eb40.bin corresponding to the Boot program
- angel_at91.rom for EB40 corresponding to the Angel Debug Monitor
- wave_pwm.bin corresponding to the Default User Application

These files can be downloaded from the Software Section under the AT91 ARM Thumb Microcontroller Unit Product page on the Atmel Web Site.

How to Upgrade Files

The user merely needs to download the binary files at different addresses of the Flash memory. The following addresses are for downloading with an ICE interface and Angel Debug Monitor (see warning about Angel below):

- boot_eb40.bin file at address 0x01000000
- angel_a91.rom file at address 0x01002000
- wave_pwm.bin file at address 0x01010000

Warning: Downloading with Angel Debug Monitor

To prevent possible damage to the Angel Debug Monitor during download, the user must first download the boot_eb40.bin file and the angel_at91.rom file respectively at the following addresses:

- 0x01010000
- 0x01012000

Note: This prevents overwriting the previous Angel Debug Monitor located in the lower part of the Flash memory.

Once the boot and Angel programs are downloaded, the user must set the SW1 switch to “upper mem” position and push the reset button to establish communication with the Angel Debug Monitor. In addition, the user must download the boot program and Angel Debug Monitor in the lower part of the Flash memory (at address 0x01000000 and 0x010020000). Once again, the user must ensure the Angel Debug Monitor is operational in the lower part of the Flash memory. The default user application must be downloaded at address 0x01010000 (see Section 3.12 in the EB01 User Guide).

While the AT91R40807 is on and these files are downloaded into the Evaluation Board’s Flash memory, the EB40 Evaluation Board is fully operational.

The upgrade can be checked by using the Functional Test Software mode as described in the EB40 User Guide. The Angel Debug Monitor can be checked by establishing communication between the board and a debugger (ARM SDT, ASPEX, Green Hills).

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