

How to Upgrade an AT91FR4081-based System to an AT91FR40161-based System

Background

The AT91FR4081 and AT91FR40161 are members of the Atmel AT91 16/32-bit microcontroller family which is based on the ARM7TDMI™ processor core. Their main difference is that the AT91FR4081 has 1M bytes of Flash Memory and the AT91FR40161 has 2M bytes of Flash Memory.

This Application Note outlines the hardware and software operations necessary to upgrade an AT91FR4081-based system to an AT91FR40161-based system.

Hardware Requirements

Microcontroller Replacement

As the AT91FR4081 and the AT91FR40161 are pin-to-pin compatible and are both packaged in a 120-ball BGA package, the only action the user needs to take is to install the AT91FR40161 in the place of the AT91FR4081 in the application.



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**Application Note
Preliminary**



Software Compatibility

As the core, the architecture and the peripherals of both the AT91FR4081 and the AT91FR40161 are compatible, any program written for an AT91FR4081-based system can run as is on the same system built with an AT91FR40161, with the exception of aspects related to the Flash memory organization and commands.

Flash Memory Differences

The embedded Flash memories in the AT91FR4081 and the AT91FR40161 are not identical. The differences between the two Flash Memories are shown in Table 1.

Table 1. Differences between the Flash Memories Embedded in the AT91FR4081 and the AT91FR40161

Features	AT91FR4081	AT91FR40161
Memory datasheet	AT49BV/LV8011(T) 8-megabit (512K x 16/1M x 8) 3-volt Only Flash Memory Datasheet	AT49BV/LV1604/1614A(T) 2-Mbyte (1M x 16/2M x 8) 3-volt Only Flash Memory Datasheet
Memory capacity	512K words of 16 bits	1M words of 16 bits
Memory organization	<ul style="list-style-type: none"> - Memory Plane A: Four 4K-word, two 8K-word and two 16K-word Sectors - Memory Plane B: Fourteen 32K-word Sectors 	<ul style="list-style-type: none"> - Memory Plane A: Eight 4K -word and Seven 32K - word Sectors - Memory Plane B: Twenty-four 32K-word Sectors
Sector erase architecture	<ul style="list-style-type: none"> - Fourteen 32K-word Sectors with Individual Write Lockout - Two 16K-word Sectors with Individual Write Lockout - Two 8K-word Sectors with Individual Write Lockout - Four 4K-word Sectors with Individual Write Lockout 	<ul style="list-style-type: none"> - Thirty-one 32K-word Sectors with Individual Write Lockout - Eight 4K-word Sectors with Individual Write Lockout
Device code	0x00CB	0x00C0 (Additional device code = 0x00C8)
Command definition	All command definitions are different, refer to the relevant datasheet for details	



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