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 micro-controller 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.

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	- Memory Plane A: Four 4K-word, two 8K-word and two 16K-word Sectors - Memory Plane B: Fourteen 32K-word Sectors	- Memory Plane A: Eight 4K -word and Seven 32K -word Sectors - Memory Plane B: Twenty-four 32K-word Sectors
Sector erase architecture	- 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	- 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	

Atmel Corporation

2325 Orchard Parkway
San Jose, CA 95131, USA
Tel: 1(408) 441-0311
Fax: 1(408) 487-2600

Regional Headquarters

Europe

Atmel Sarl
Route des Arsenaux 41
Case Postale 80
CH-1705 Fribourg
Switzerland
Tel: (41) 26-426-5555
Fax: (41) 26-426-5500

Asia

Room 1219
Chinachem Golden Plaza
77 Mody Road Tsimshatsui
East Kowloon
Hong Kong
Tel: (852) 2721-9778
Fax: (852) 2722-1369

Japan

9F, Tonetsu Shinkawa Bldg.
1-24-8 Shinkawa
Chuo-ku, Tokyo 104-0033
Japan
Tel: (81) 3-3523-3551
Fax: (81) 3-3523-7581

Atmel Operations

Memory

2325 Orchard Parkway
San Jose, CA 95131, USA
Tel: 1(408) 441-0311
Fax: 1(408) 436-4314

Microcontrollers

2325 Orchard Parkway
San Jose, CA 95131, USA
Tel: 1(408) 441-0311
Fax: 1(408) 436-4314

La Chantrerie
BP 70602
44306 Nantes Cedex 3, France
Tel: (33) 2-40-18-18-18
Fax: (33) 2-40-18-19-60

ASIC/ASSP/Smart Cards

Zone Industrielle
13106 Rousset Cedex, France
Tel: (33) 4-42-53-60-00
Fax: (33) 4-42-53-60-01

1150 East Cheyenne Mtn. Blvd.
Colorado Springs, CO 80906, USA
Tel: 1(719) 576-3300
Fax: 1(719) 540-1759

Scottish Enterprise Technology Park
Maxwell Building
East Kilbride G75 0QR, Scotland
Tel: (44) 1355-803-000
Fax: (44) 1355-242-743

RF/Automotive

Theresienstrasse 2
Postfach 3535
74025 Heilbronn, Germany
Tel: (49) 71-31-67-0
Fax: (49) 71-31-67-2340

1150 East Cheyenne Mtn. Blvd.
Colorado Springs, CO 80906, USA
Tel: 1(719) 576-3300
Fax: 1(719) 540-1759

Biometrics/Imaging/Hi-Rel MPU/
High Speed Converters/RF Datacom

Avenue de Rochepleine
BP 123
38521 Saint-Egreve Cedex, France
Tel: (33) 4-76-58-30-00
Fax: (33) 4-76-58-34-80

Literature Requests
www.atmel.com/literature

Printed on recycled paper.