Booting U-boot from Atmel SPI Serial DataFlash® on the AT91RM9200-DK Board

AT91 ARM® Thumb® Microcontrollers

Application Note

This Application Note gives a step-by-step guide to store U-boot in Atmel's serial DataFlash connected to the SPI Chip Select 0 on the AT91RM9200-DK Board.

Having U-boot in the Serial DataFlash makes external parallel Flash unnecessary and it can be eliminated.

The procedure is as follows:

1. Download the U-Boot release 1.0.0, available on SourceForge.net:
   – http://sourceforge.net/projects/u-boot

2. Download the file uboot-DataFlash_1_01.zip associated with this Application Note on Atmel's website, AT91ARM Thumb - Application Notes:
   – http://www.atmel.com/dyn/products/app_notes.asp?family_id=605

3. Apply the patch "patch-u-boot-AT91RM9200-dataflash.dat" to U-boot that enables booting via the SPI DataFlash. Use the following command to apply the patch:
   – cat patch-u-boot-AT91RM9200-dataflash.dat | patch -p1 -d u-boot-1.0.0/

4. Set the flag CFG_ENV_IS_IN_DATAFLASH in "..include/con figs/at91rm9200dk.h" source file to have the Environment Variables stored in the Serial DataFlash.
5. Set the flag CONFIG_ENV_OVERWRITE in "..include/configs/at91rm9200dk.h" source file to obtain the ability to overwrite all Environment Variables.
6. Compile U-boot.

For more details about U-boot compilation refer to the U-boot Developer Manual.

Once U-boot has been patched and rebuilt, perform the following to store it into the serial DataFlash of the AT91RM9200-DK:

- Remove the resistor R159 on the AT91RM9200-DK to start the processor from its internal boot ROM.
- Connect the board to a HyperTerminal Session (115200/8N1) with the DBGU port.
- Power up the board.
- 'C' characters displayed means that the board is prepared to receive data through xmodem transfer.
- Send RomBoot.bin by xmodem. RomBoot.bin is an application with the correct setting of the 6th ARM vector that allows booting from the AT45DB642 Atmel DataFlash connected on NPCS0.
- Press the Return key on the HyperTerminal several times to disable the checking of a 6th valid vector.

This procedure facilitates stopping automatic startup of U-boot.

6067B–ATARM–04-Jun-04

Note: In the following instructions, the text in gray shows information as displayed on the HyperTerminal.

Once RomBoot.bin has been transferred, the following prompt appears on the HyperTerminal screen:

```
ATMEL LOADER VER 1.01 May 03 2004 14:54:39
*-------------------------------------*
DataFlash:AT45DB128
Nb pages:  16384
Page Size:   1056
Size=17301504 bytes
Logical address: 0xC0000000
*-------------------------------------*
1: Download Dataflash [addr]
2: Read Dataflash [addr]
3: Start U-BOOT [C0008000 => 21F00000]
*-------------------------------------*
Enter:
```

Choose "1" to download to DataFlash and copy the RomBoot.bin file in C0000000:

Enter the following command: 1 c0000000

Then 'C' characters are displayed: CCCCCCCCCC

This indicates that xmodem protocol is enabled, so resend the RomBoot.bin file using HyperTerminal xmodem.

When the download is completed, the following prompt appears:

```
Modification of Arm Vector 6 :841c018


Write 11776 bytes in DataFlash [0xc0000000]
Verify Dataflash: OK
Hit a Key!ESC[2J
ATMEL LOADER VER 1.01 May 03 2004 14:54:39
*-------------------------------------*
DataFlash:AT45DB128
Nb pages:  16384
Page Size:   1056
Size=17301504 bytes
Logical address: 0xC0000000
*-------------------------------------*
1: Download Dataflash [addr]
```

2: Read Dataflash [addr]

3: Start U-BOOT [C0008000 => 21F00000]

Enter:

It is now possible to boot from the DataFlash and copy the desired application into it. In this case, it is to have U-boot in the DataFlash in order to boot from it. Care should be taken to not erase RomBoot.bin in the DataFlash.

Use the U-boot binary image generated as described in point 5. on page 1 to download it into the DataFlash at address 0xC0008000 of the DataFlash.

Choose "1" to download to DataFlash and copy the u-boot.bin file in C0008000:

Enter: 1 C0008000

Then 'C' characters are displayed CCCCCCCCCC

Send the u-boot.bin file using HyperTerminal xmodem transfer.

U-boot is now stored in the Serial DataFlash and can be started up. Reset the board to restart U-boot from the Serial DataFlash.

Document Details

Title	Booting U-boot from Atmel SPI Serial DataFlash on the AT91RM9200-DK
Literature Number	6067

Revision History

Version A	**Publication Date:** 06-Apr-04
Version B	**Publication Date:** 04-Jun-04
Page: 1	Step 2. Download Software Zip file changed.
Page: 2 & 3	HyperTerminal instructions changed.

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6067B–ATARM–04-Jun-04 0M