Using the EBLoad™ Tool to Download Applications to the AT91 Evaluation Boards

AT91 ARM® Thumb® Microcontrollers

Application Note

Introduction

EBLoad™ from RTJ Computing(1) is a software tool used to download a user application into the memory of an AT91 evaluation board. It is fully compatible with the SRAM downloader or with the Flash uploader embedded in the evaluation board. The memory type available depends on the boot code revision level of the board. See Table 1.

Table 1. Evaluation Board Memory Types

Evaluation Board	Boot Version	SRAM Downloader	Flash Uploader
EB40A	1.0 and above	Yes	Yes
EB42	1.02 and above	Yes	Yes
EB55	2.2 and above	Yes	Yes
EB63	2.1 and above	Yes	Not available

This Application Note describes the procedure for download of an application into the SRAM or Flash of an AT91 evaluation board using the EBLoad tool.

Note that the example screen shots illustrating this Application Note are those appearing when the AT91EB42 evaluation board is used. However, the procedures described are valid for all AT91 evaluation boards listed in Table 1.

Note: 1. For further information on RTJ Computing, refer to AT91 Third Party Development Tools Guide, literature number 1307.

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Using the SRAM Downloader

The SRAM downloader allows a binary file to be downloaded into the on-chip or on-board SRAM. Refer to Table 2.

Table 2. Evaluation Board and SRAM Type

Evaluation Board	Boot Version	On-chip SRAM Address	On-board SRAM Address
EB40A	1.0 and above	0x100	Not available
EB42	1.02 and above	Not available	0x2000000
EB55	2.2 and above	Not available	0x2000000
EB63	2.1 and above	Not available	0x2000000

To check the boot code version:

1. Start a HyperTerminal session (9600 N-8-1).
2. Connect the Serial A port of the Evaluation Board to a COM port of the PC.
3. Power up the board or press the reset button. The following banner appears: “Angel Debug Monitor (serial) 1.04 (Advanced RISC Machines SDT 2.5) for AT91EB42 (1.02) Angel Debug Monitor rebuilt on Feb 03 2002 at 16:10:09”. The information regarding the boot version follows the name of the AT91 board. In this case, the AT91EB42 board contains V1.02 of the boot software, which corresponds to Table 2.
4. Other ASCII characters may also be displayed but can be ignored.

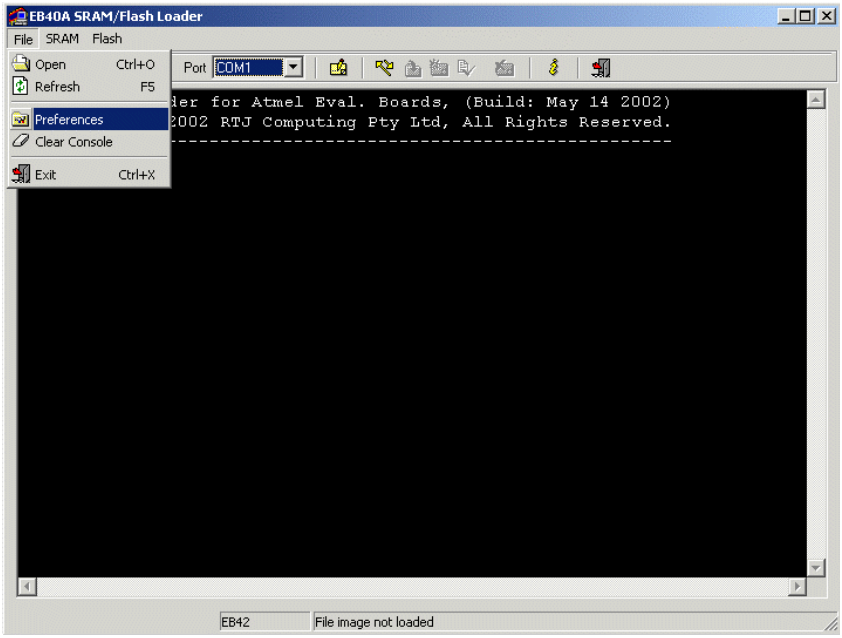
Powering-up the Board

To power-up the evaluation board:

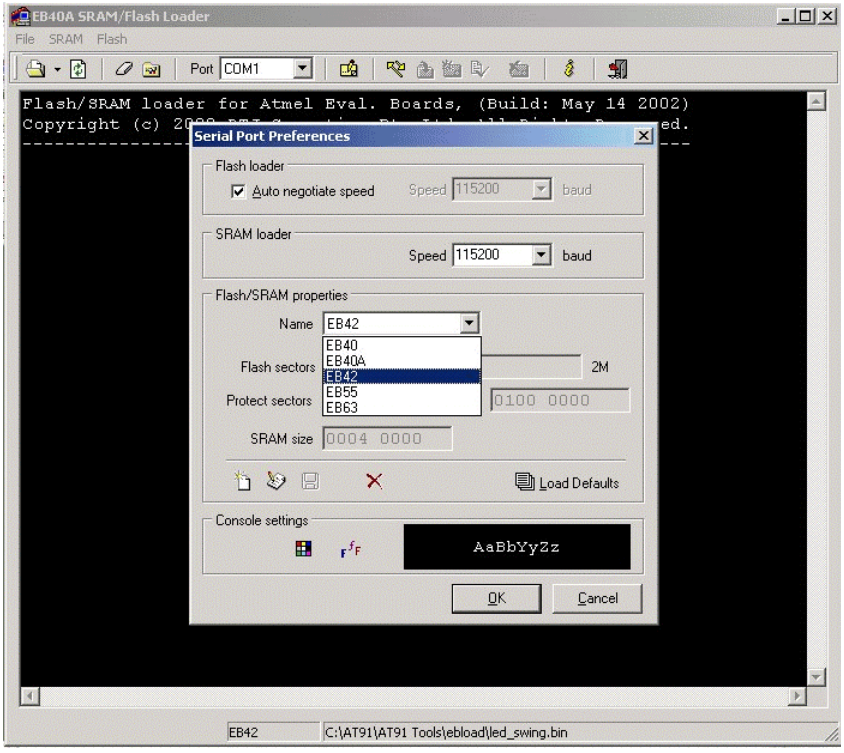
1. Connect the Serial A port of the AT91EBXX Evaluation Board to the Serial Port of a host PC using the straight serial cable provided with the Evaluation Board.
2. Power-up the board or press the RESET button (SW5) and, at the same time, hold down the SW2 button.
3. Wait for all the LEDs to light up and then release SW2. LED2 remains lit and the SRAM downloader is activated.

Interfacing with EBLoad

1. Start the EBLoad tool.
2. Select Preferences from the File menu.

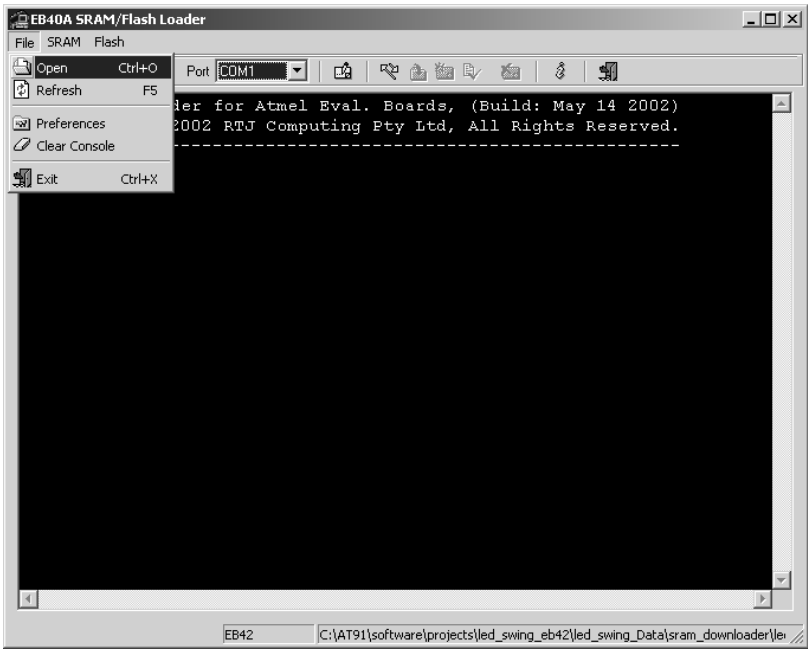


3. In the window, select the board type and set speed to 115200 baud for all board types.



4. Click OK.

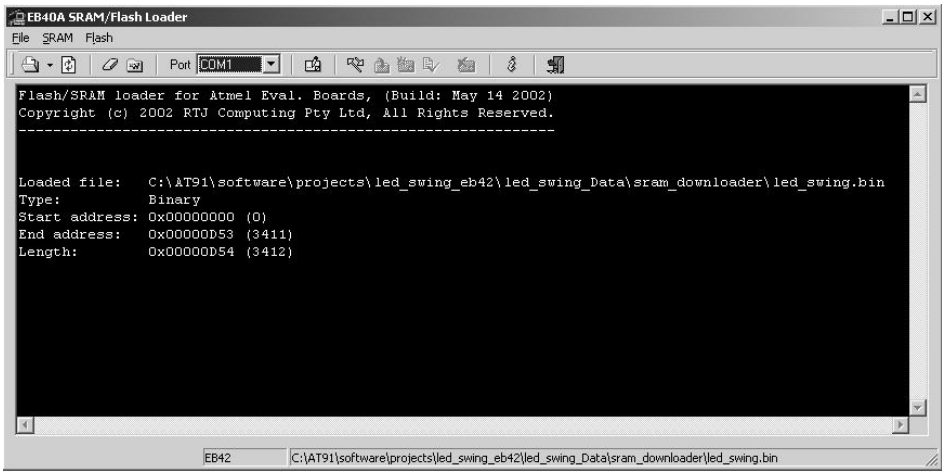
5. From the File menu, choose the Open command and select the pathname: `<my_hdd:>\AT91\software\projects\led_swing_eb42\led_swing_Data\sramdown-loader\led_swing.bin`:



The led_swing.bin program can be found on the Atmel web site at http://www.atmel.com/atmel/products/prod35.html, or on the AT91 CD ROM dated January 2002. Make sure that the **full** AT91 Library package (AT91LibV210_full.exe or above) is installed on your hard disk. If the "Light" version of the AT91 Library is installed, the driver library, the part library and the demo program must be rebuilt.

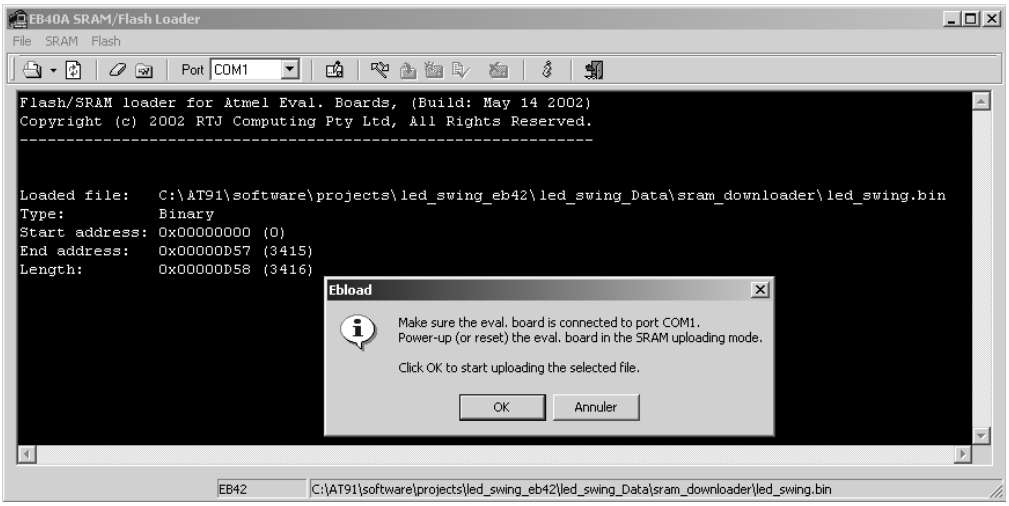
Note: If the user chooses to work with his own binary file, the following points must be taken into consideration:
C Compiler Settings: No Debug Information
Linker Settings: No Debug Information
RO and RW Address: Pointing to the On-chip or to the On-board SRAM or both.
Post-Linker Settings: Must be set to generate a plain binary image (Use ARM FromELF)

6. Once the appropriate demo program has been chosen, the following screen appears:

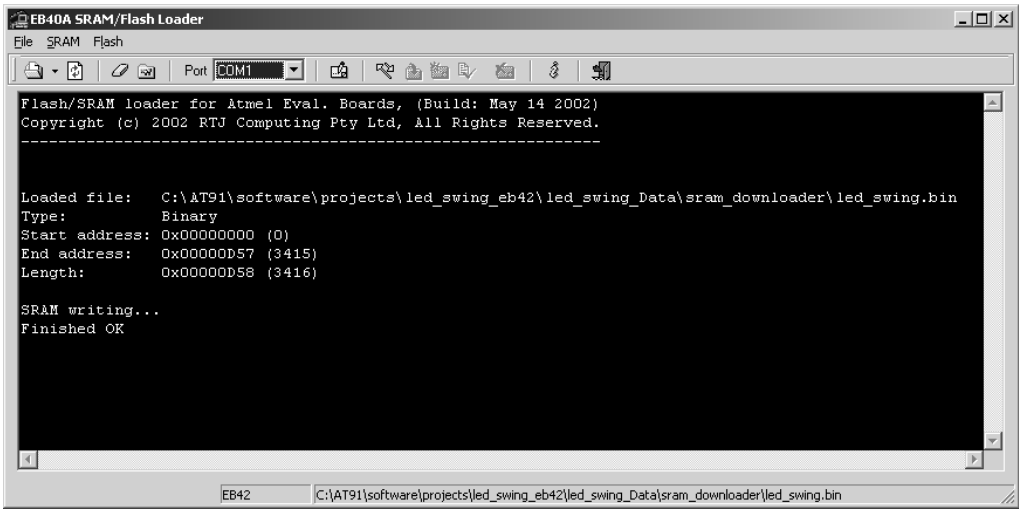


Loading the Binary File into SRAM

1. Choose the upload command from the SRAM menu. The Ebload window appears:



2. Click OK to start the SRAM downloader.
3. Make sure that the download procedure has finished without error:



4. If OK, press SW2 on the board to start the demo or your own program in the SRAM.

Using the Flash Uploader

The Flash uploader downloads a binary file into the on-board Flash memory. Refer to Table 1 for evaluation board memory availability.

Starting the Flash Uploader

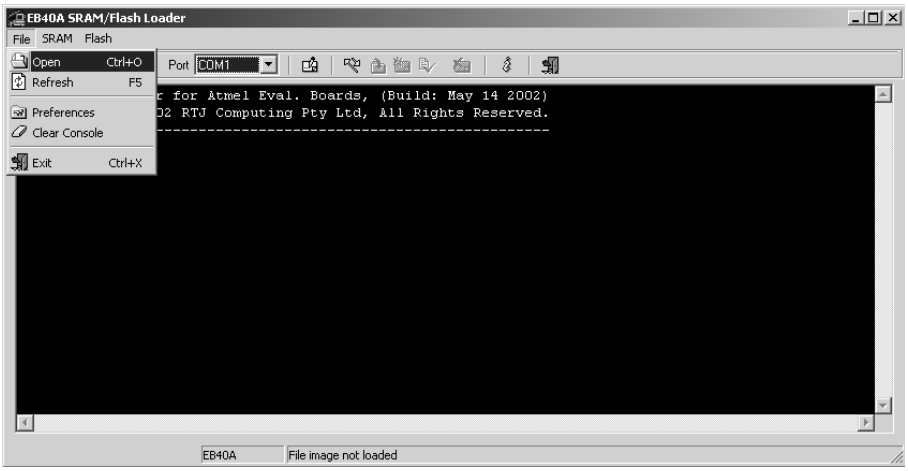
To start the Flash uploader on the board:

1. Connect the Serial A (or B[1]) port of the AT91 Evaluation Board to a host PC Serial Port using the straight serial cable provided.
2. Check that JP1 is in STD position. Power-on or press RESET, holding down the SW3 button at the same time. Wait for all LEDs to light up together and then release SW3. LED3 remains lit and the Flash Uploader is activated.

Note: 1. For the Serial B port, use a female/female straight serial cable.

Interfacing with EBLoad

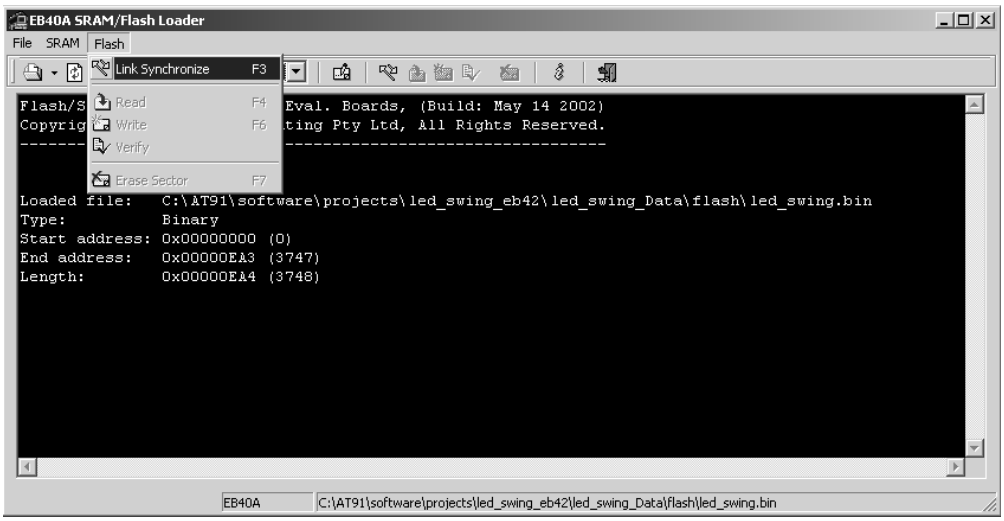
1. From the File menu, choose the Open command and select the pathname:
   `<my_hdd:>\AT91\software\projects\led_swing_eb42\led_swing_Data\flash\led_swing.bin`



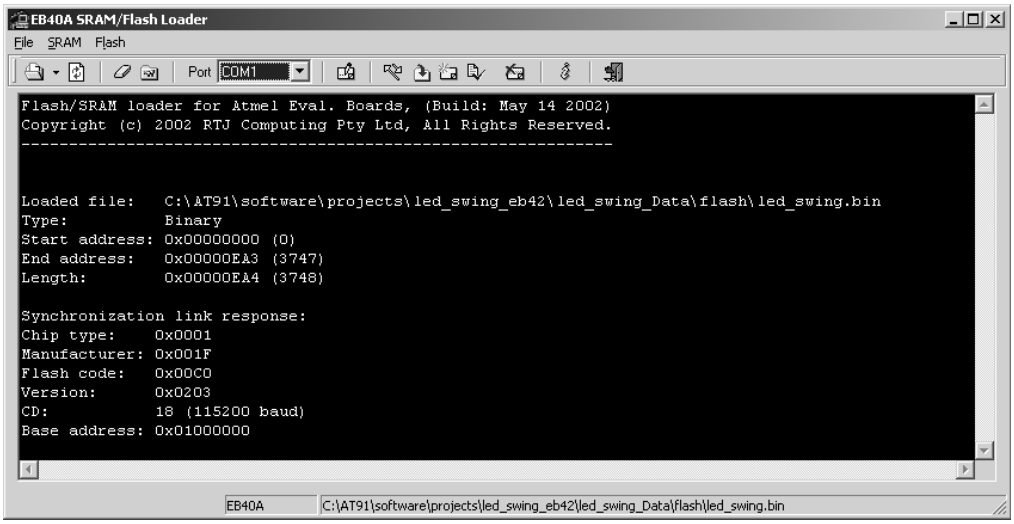
The led_swing.bin program can be found on the Atmel web site at http://www.atmel.com/atmel/products/prod35.html, or on the AT91 CD-ROM dated January 2002. Make sure that the **full** AT91 Library package (AT91LibV210_full.exe or above) is installed on your hard disk. If the “Light” version of the AT91 Library is installed, the driver library, the part library and the demo program must be rebuilt.

Note: If the user chooses to work with his own binary file, the following points must be taken into consideration:
C Compiler Settings: No Debug Information
Linker Settings: No Debug Information
RO address: Pointing to the on-board Flash
RW address: Pointing to the on-board SRAM for all boards except EB40A. For the EB40A RW address must point to on-chip SRAM.
Post-linker Settings: Must be set to generate a plain binary image (Use ARM FromELF)

2. In the menu Flash, choose Link Synchronize and click OK on the dialog box that appears.

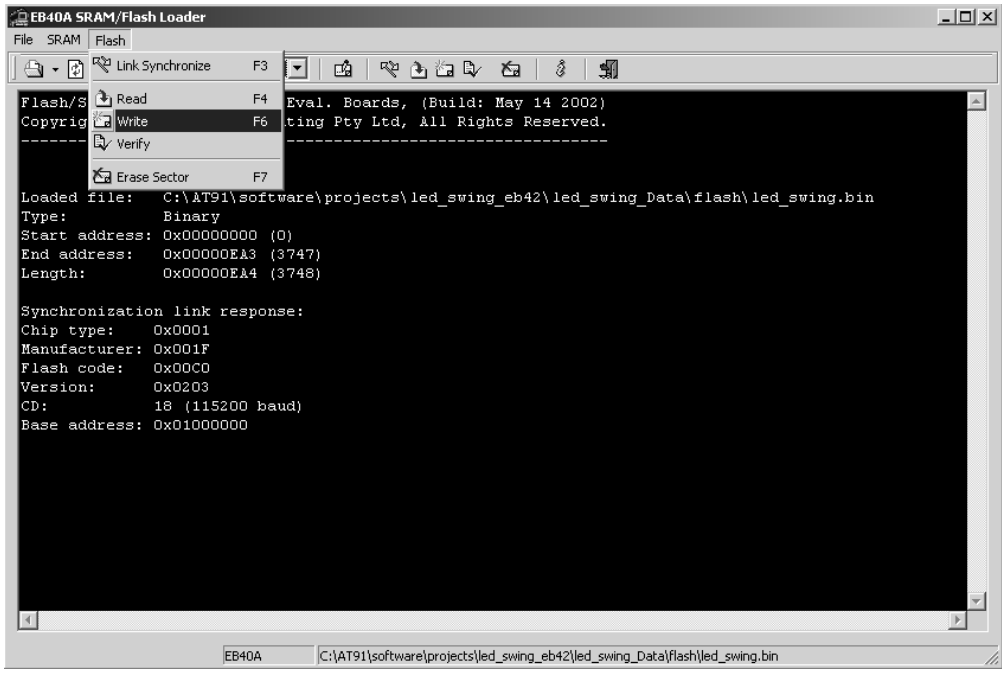


3. Once the Flash uploader is correctly synchronized with the EBLoad tool, the following screen appears:



Loading the Binary File into Flash Memory

1. Select the Write option in the Flash menu:



2. Enter the start address of the upper part of the Flash memory to download the binary file and click OK. The start address depends on the board type and can be obtained from Table 3.

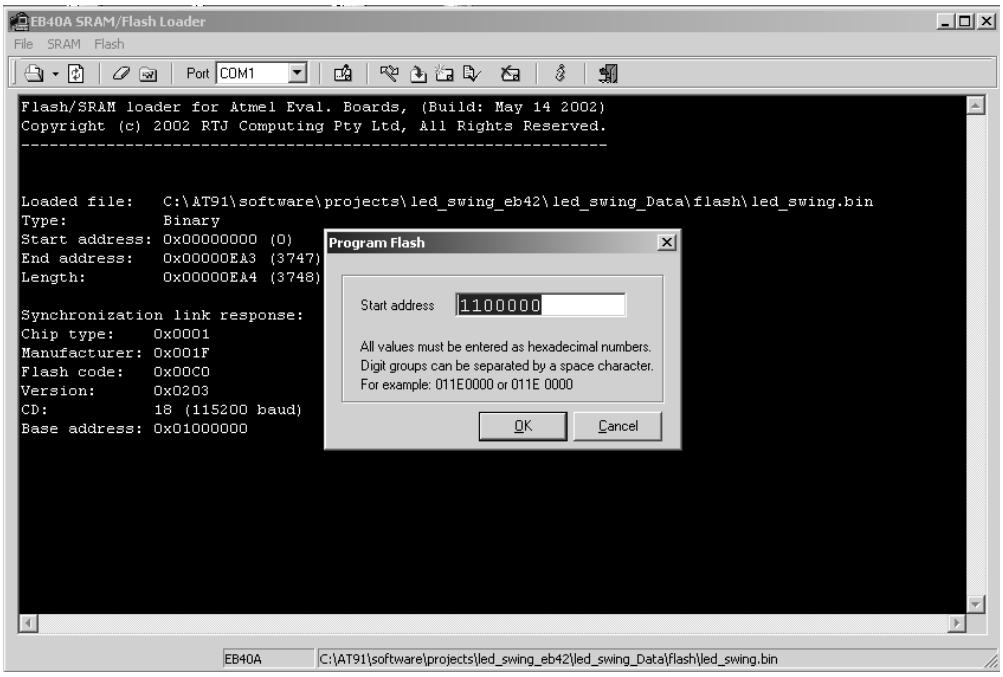
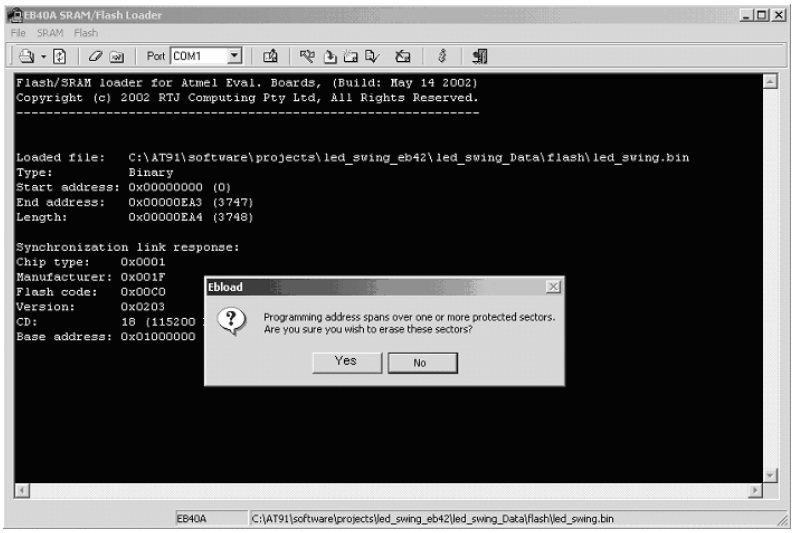


Table 3. Evaluation Board and Start Address of Upper Part of Flash Memory

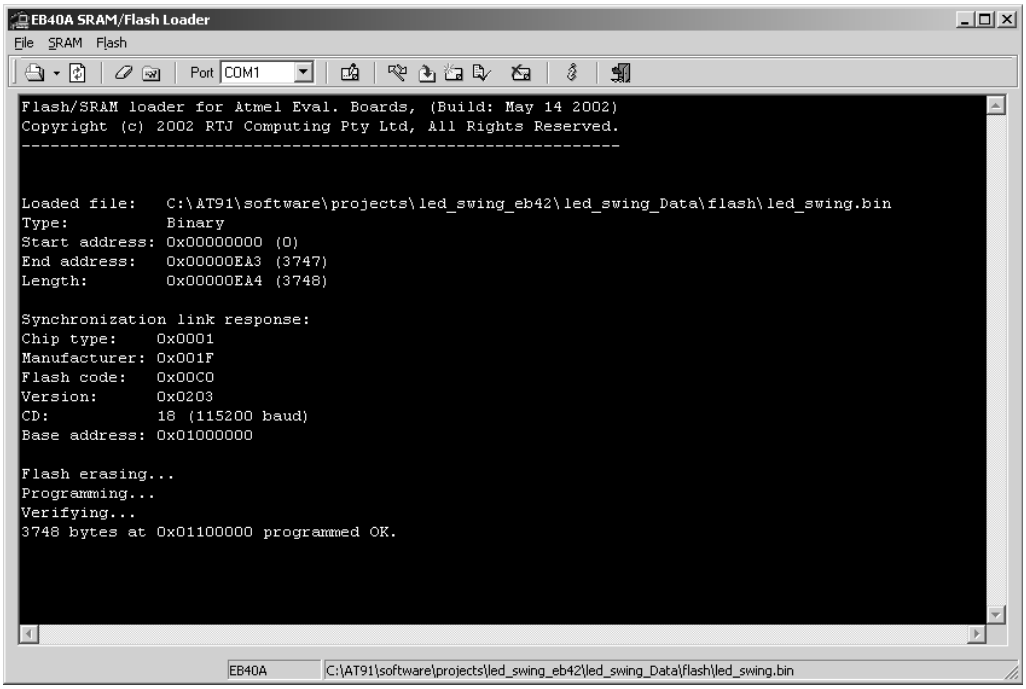
Evaluation Board	Start Address of Upper Part of Flash Memory (in hexadecimal)
EB40A (1.0 and above)	0x01100000
EB42 (1.02 and above)	0x01100000
EB55 (2.2 and above)	0x01100000
EB63 (2.1 and above)	0x01100000

Note: It is strongly advised not to write to the address space between 0x1000000 and the addresses given in Table 3. This space contains the boot code and the Angel Debug Monitor. If data is entered here, the boot code and the Angel Debug Monitor are overwritten and the board will not start up.
If data is entered in this area, a warning box is displayed:



This address space may be written to only if the software application functions correctly and the Angel Debug Monitor is not used as a debug solution.
Note that if an ICE interface is used, e.g., Raven/Wiggler, MultiICE or other, the boot code and Angel Debug Monitor are recoverable in case of overwrite.

3. Check that the programming sequence has completed without error:



4. If the address in Table 3 is used, the jumper JP1 must be set to the USER position.
5. Reboot the board and check that the demo application or user application starts.

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