AVR282: USB Firmware Upgrade for AT90USB

Features

- **Supported by Atmel FLIP program on all Microsoft® O/S from Windows® 98SE and later**
- **FLIP 3.2.1 or greater supports Linux**
- **Default on chip USB bootloader**
- **In-System programming through the USB interface/No external hardware needed**
- **Up to 32Kbytes/s**

1. Introduction

The aim of this document is to describe how to perform the firmware upgrade of the AT90USB products using the on-chip bootloader and FLIP software.

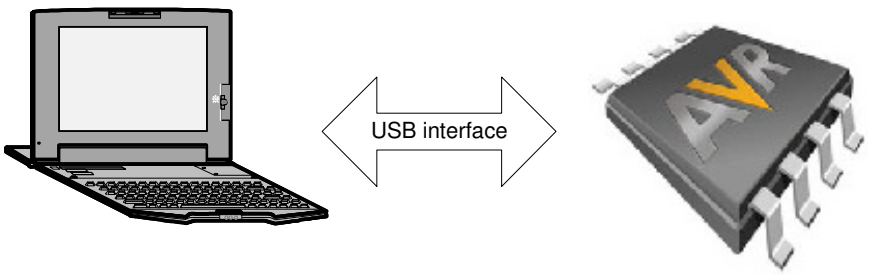
2. Description

The AT90USB products are delivered with an on-chip bootloader. This bootloader allows the user to program the FLASH/EEPROM memories through the USB interface.

To perform firmware upgrade, Atmel has developed an application called "**FLIP**". This software is a flexible application which lets you program and configure Atmel's micro-controller devices in their final environment without needing any dedicated hardware.

The latest release of FLIP offers the following capabilities:

- Perform In-System Programming through RS232, ***USB*** or CAN interfaces.
- May be used through its intuitive Graphical User Interface or launched from a DOS window, from an embedded software IDE (AVR Studio), or even from your own application
- Buffer editing capabilities: fill, search, copy, reset, modify, goto address.
- Target device memory control: erase, blank check, program, verify, read, security level and special bytes reading and setting.
- Parts serialization capability (from *batchisp* only).
- ISP hardware conditions may be set by software.



8-bit AVR® Microcontrollers

Application Note

Rev. 7769A–AVR–01/08

3. Hardware Requirements

1. AVR USB evaluation board (ATSTK525/STK526, AT90USBKey or any kit for the AT90USB family)
2. AT90USB microcontroller
3. USB cable (Standard A to Mini B)
4. PC running on Windows (98SE, ME, 2000, XP) with USB support.

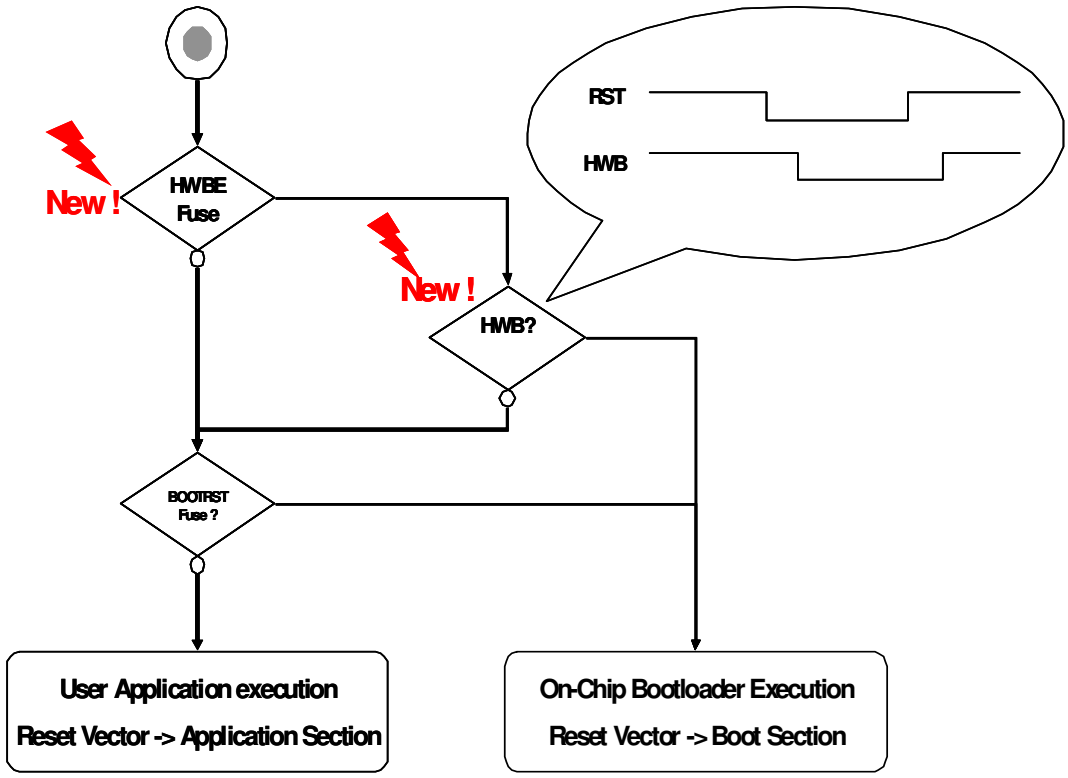
4. Software Requirement

The software needed for this application include:

- FLIP software (Device Firmware Upgrade tool) **version 3.2.0 or above**.

5. Bootloader Process

Figure 5-1. Bootloader Process



As shown in the above figure, the AT90USB products have a new fuse bit (Comparing to a standard AVR device). This fuse bit is the HWBE, it is enabled by default. Adding to this new fuse bit, the AT90USB products have a new pin: the HWB. This pin should be active low under RESET to launch the bootloader.

To allow the user to perform the bootloader function, all AT90USB kits have two buttons: RST to active the reset and the HWB to active the HWB pin.

6. Device Firmware Upgrade

The “Flip” software is the tool used to upgrade the firmware (available freely in the USB CD-ROM or Atmel website).

The following steps should be completed to allow the device starting DFU mode (bootloader), and program the FLASH or the EEPROM memory:

1. Install Flip software (Flip version 3.0 or above is required).
2. Connect the AT90USB board (STK525, AT90USBKey...) to the PC using the USB cable (Standard A to Mini B).
3. Push the HWB (Hardware Bootloader) button
4. Push the RST (Reset) button
5. Release the RST button
6. Release the HWB button
7. If your hardware conditions explained above are correct, a new device detection wizard will be displayed. Please follow the instructions (the INF file is located in the USB subdirectory from Flip installation: “install path:\ATMEL\FLIP\FLIPx.x.x\usb”). The new device detection wizard may not appear if the suitable hardware is already installed, you can jump to step 8.

Figure 6-1. New Device Detection Wizard

Figure 6-2. Driver Location

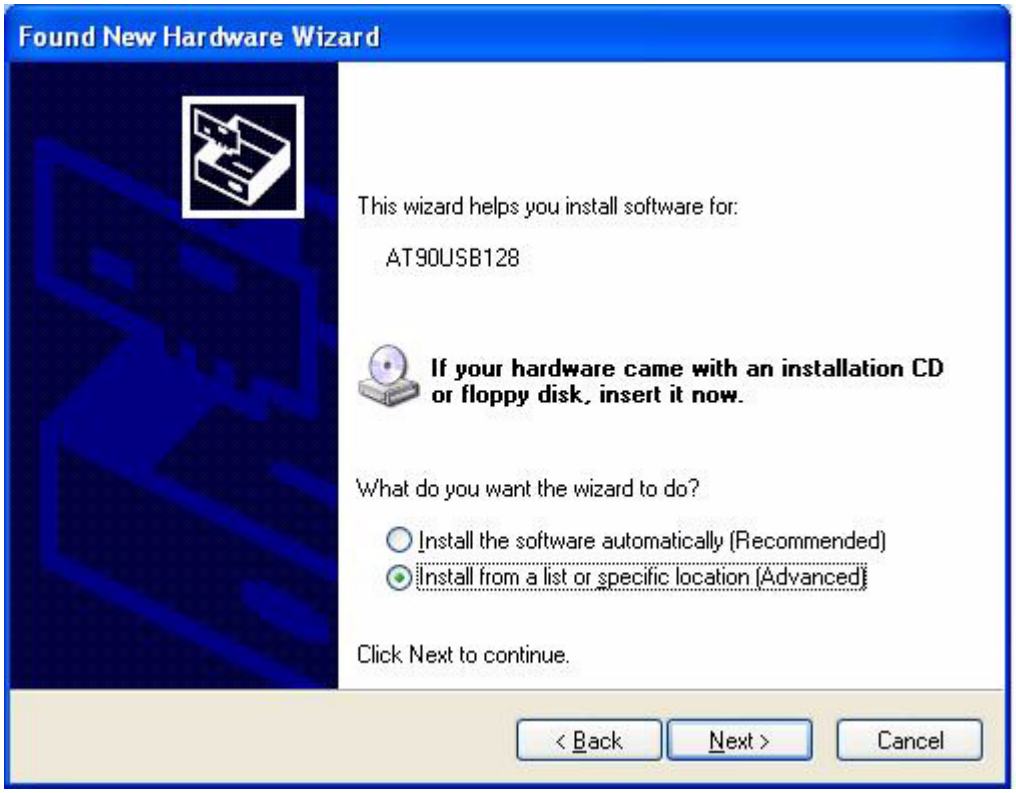
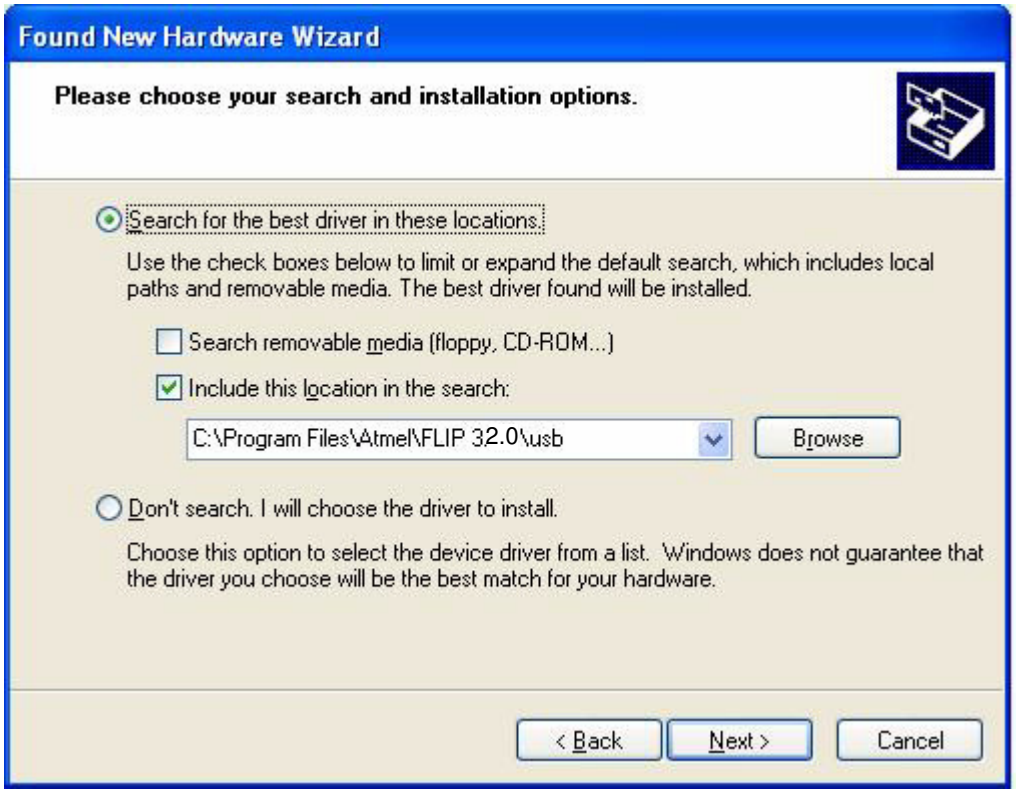
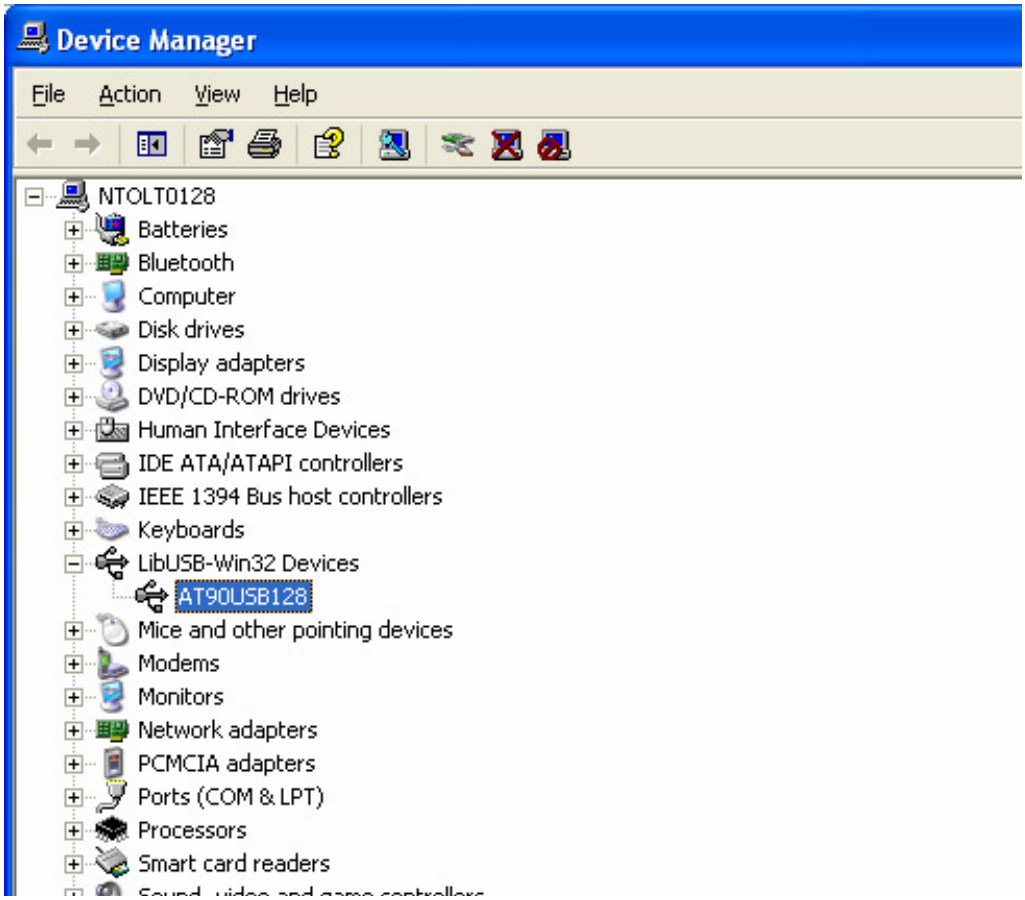


Figure 6-3. Driver selection



8. Check the Device Manager Figure 6-4. and you should see the same icon (Atmel DFU icon) as shown in the figure below. If not, repeat step 2.

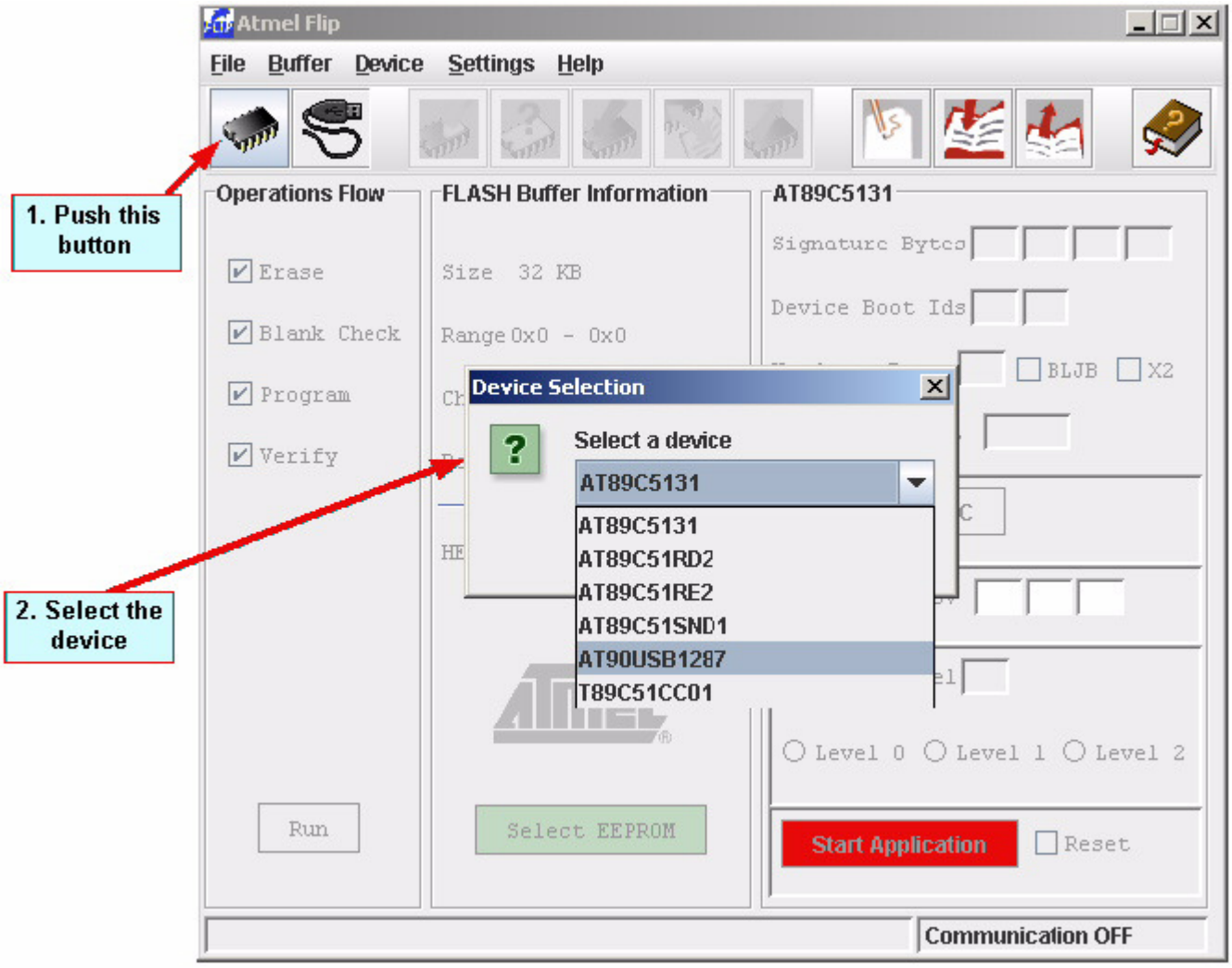
Figure 6-4. Device Manager



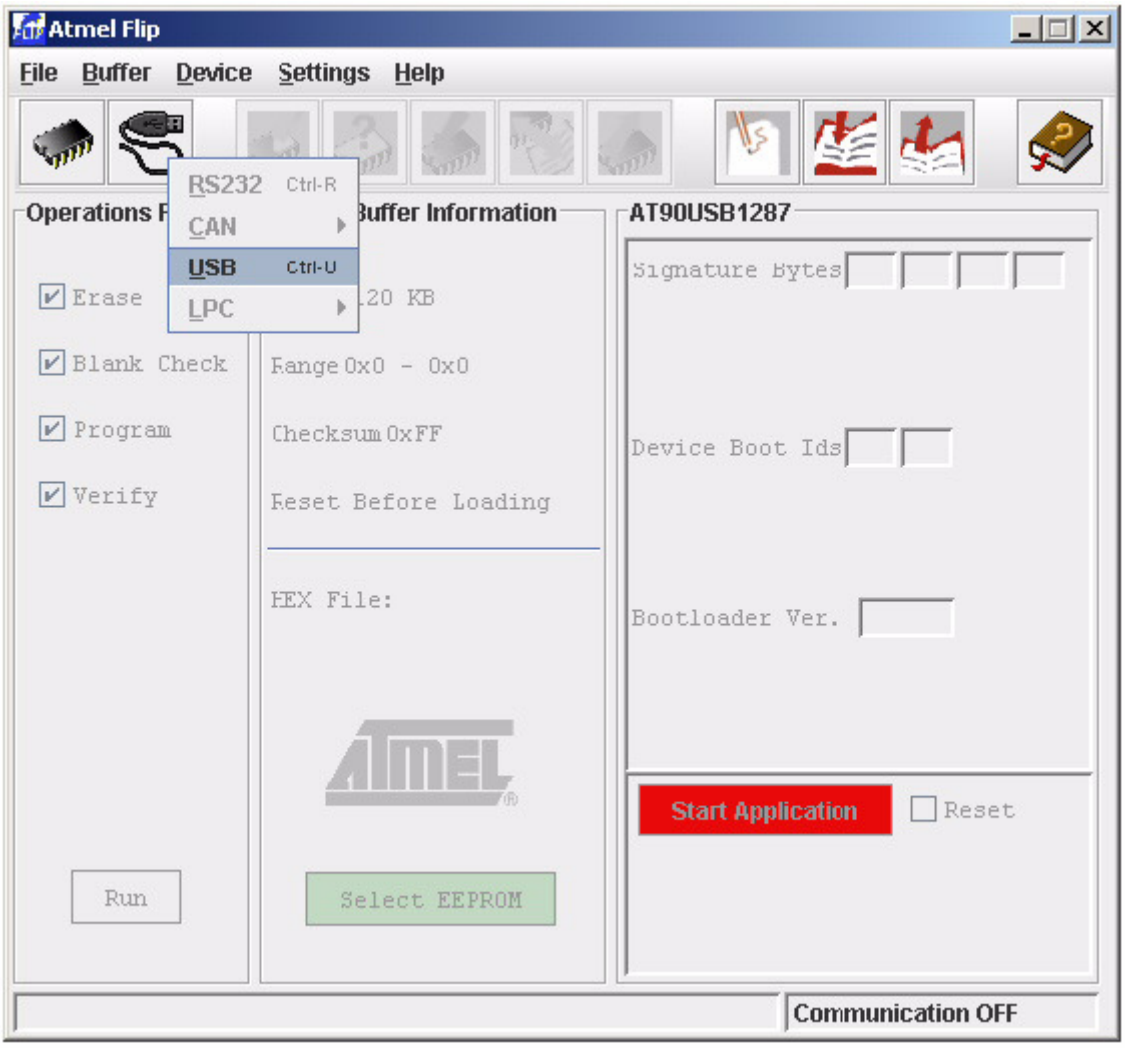
Once your device is in DFU mode, launch the Flip software and follow the instructions explained below, Figure 6-5.

1. Select AT90USB device

Figure 6-5. Device Selection

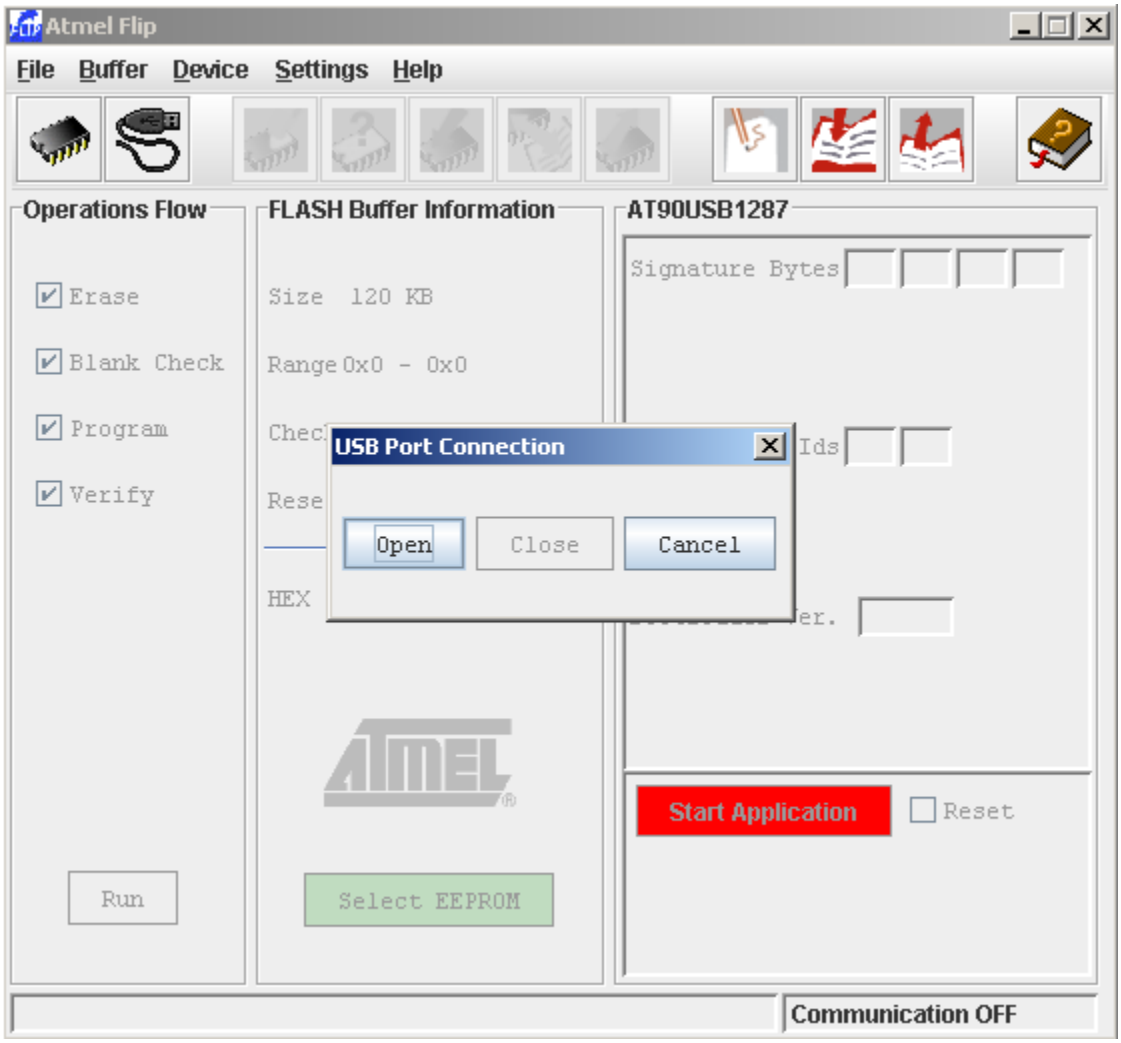


2. Select USB as communication mode
   a. USB Communication Mode



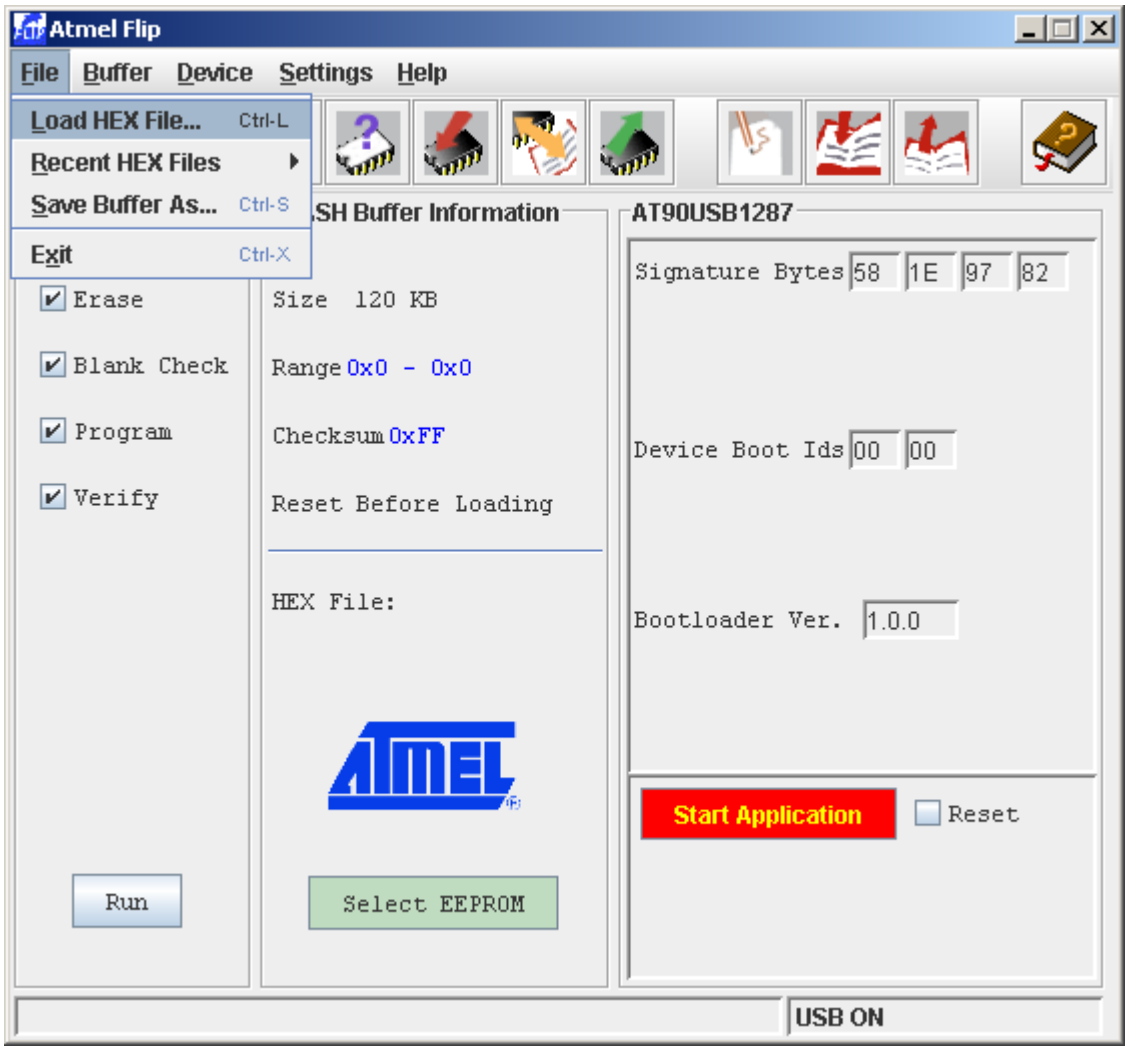
3. Open the communication

Figure 6-6. Open the USB Communication



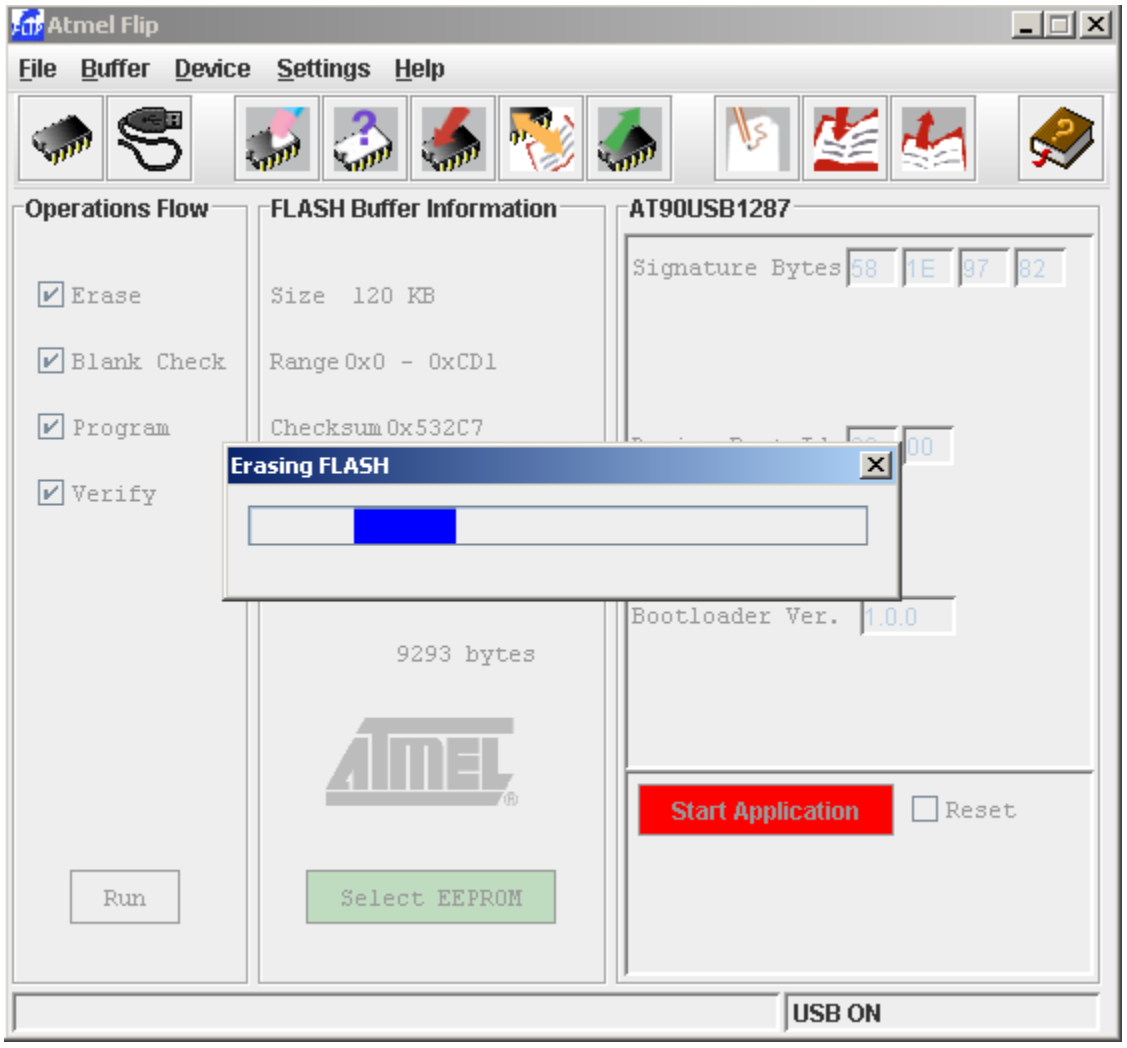
4. Choose the HEX file to load:

Figure 6-7. HEX File to Load



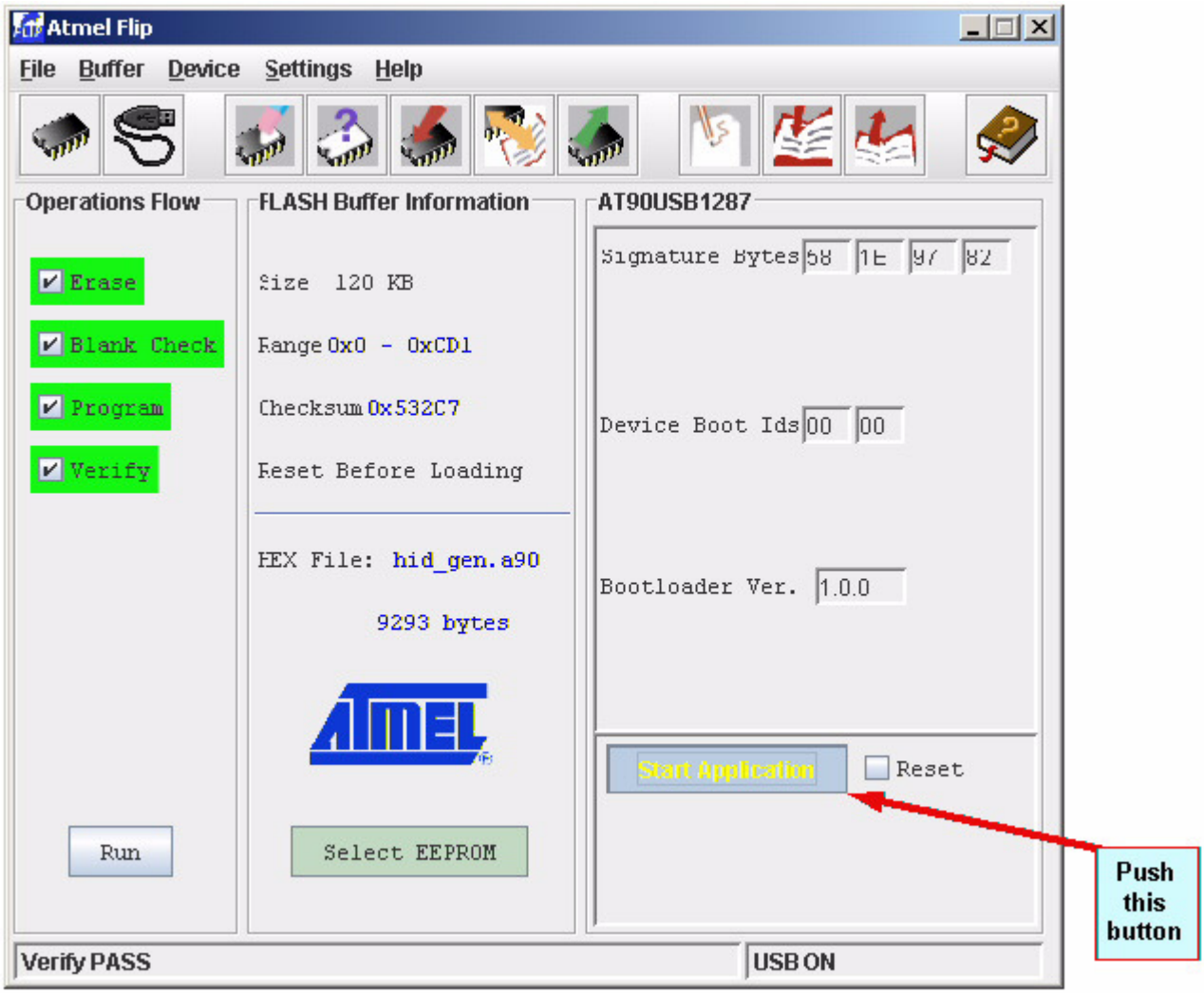
5. Load the HEX file (*Check Erase, Blank Check, Program* and *Verify*, then Push *Run* button)

Figure 6-8. HEX File Loading



6. Start the application

Figure 6-9. Start Application



Note: The AT90USB bootloader will detach and jump into the user application when “Start Application” button is pressed.

7. FAQs

1. After programming my device using the JTAGICE MKII or the AVRISP, I cannot start the bootloader anymore?

- When you use the JTAGICE MKII or AVRISP, the first instruction performed is the full chip erase. This instruction erases the whole of the flash memory and deletes the bootloader. You have to load the bootloader HEX file again using the JTAGICE MKII or the AVRISP to be able to use flip software to program the device.

2. I have a Flip 2.4.x/3.0.x version on my computer. I installed Flip 3.1.y, When I start the bootloader, I cannot see the Amel DFU icon in my device manager window as shown in the figure 6.4, I still have the Jungo icon?

- Flip 2.4.x and Flip 3.1.y are not using the same USB driver. You have to update the driver used for the bootloader:
  - Open the device manager
  - Right-click on the AT90USB Jungo icon
  - Select Update Driver
  - Continue as described in the section 6 (Device Firmware Upgrade)

3. Can I modify the fuse bits using Flip?

- No, Flip cannot modify the fuse bits. To modify the fuse bit you can use either the JTAG ICE MKII, the AVRISP MKII, or parallel programming.

4. What is the difference between starting the application with the Reset box checked off or not?

- If you start the application with the Reset box checked off, the device will start after a Watchdog reset and this watchdog will remain active. You need to disable the Watchdog in your application. Resetting the device, ensures there is no side effect from resources used by the boot-loader before starting the user application.

8. Related Documents

- USB DFU Bootloader Datashet (doc 7618)
- Help content of Flip

Headquarters

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

International

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

Atmel Europe
Le Krebs
8, Rue Jean-Pierre Timbaud
BP 309
78054 Saint-Quentin-en-
Yvelines Cedex
France
Tel: (33) 1-30-60-70-00
Fax: (33) 1-30-60-71-11

Atmel 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

Product Contact

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