Please note that Cypress is an Infineon Technologies Company.
The document following this cover page is marked as “Cypress” document as this is the company that originally developed the product. Please note that Infineon will continue to offer the product to new and existing customers as part of the Infineon product portfolio.

Continuity of document content
The fact that Infineon offers the following product as part of the Infineon product portfolio does not lead to any changes to this document. Future revisions will occur when appropriate, and any changes will be set out on the document history page.

Continuity of ordering part numbers
Infineon continues to support existing part numbers. Please continue to use the ordering part numbers listed in the datasheet for ordering.

THIS SPEC IS OBSOLETE

Spec No: 002-05237

Spec Title: AN205237 - FM3 MB9B500 Microcontroller with USB Flash Loader Demonstration System

Replaced by: None

AN205237

FM3 MB9B500 Microcontroller with USB Flash Loader Demonstration System

This document mainly introduces the operation process. The Flash Loader is used for the user to download the user code from the PC to the board by the USB interface.

Contents

1 Introduction....1
1.1 About UART Flash Loader....1
1.2 About MB9B500 Series MCU....2
1.3 About USB Flash Loader Demo....2
1.4 About Document....2
2 USB Flash Loader Demo System Components....2
3 USB Flash Loader Overview....2
4 USB Flash Loader Usage Step....2
4.1 Interface Introduction....2
4.2 COM Select....4
4.3 Connection....5
4.4 Blank Check....6
4.5 Erase....7
4.6 File Select....8
4.7 Program and Verify....9
4.8 Get Version....10
4.9 Get Code....11
4.10 Preparation....13
5 Example Project....13
5.1 Components....13
5.2 Usage Scenario....15
5.3 User code make....15
6 Document History....16

OBSOLETE

1 Introduction

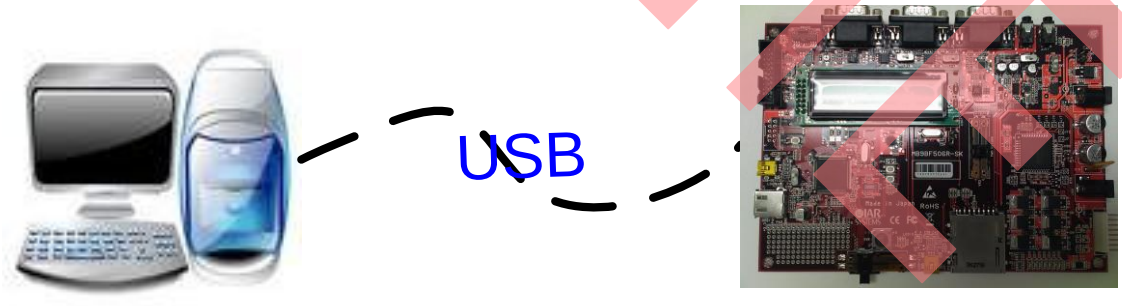
1.1 About UART Flash Loader

The Flash Loader is used for the user to download the user code from the PC to the board by the USB interface.

For FM3, there is a boot loader program embedded in the MCU, and this program can be used for the customer to download the code from the PC to the board, but mode pin must be used in this operation mode. For some users, they hope no other H/W resource to be used in program update process, so the USB Flash Loader is developed for these users.

In this application, the USB port of the target board is worked as a virtual com port. Though the PC connect the board with the USB line, the board is recognized as a COM port device for the PC.

Rough view:



1.2 About MB9B500 Series MCU

MB9B50X series MCU is 32-bit general purpose MCU of FM3 family that features the industry's leading-edge ARM Cortex-M3TM CPU and integrates Fujitsu's highly reliable and high-speed secure embedded flash technology. This MCU can operate at up to 80MHz CPU frequency and work at a wide voltage range (2.7-5.5V), which can be both compatible with 3.3 V and 5 V system.

It includes a host of robust peripheral features, including motor control timers (MFT), base timer (can be configured to PWM, PPG, Reload, PWC timer), ADCs, on-chip memory (up to 512K Flash, up to 64K SRAM) and a wide range of communication interfaces (USB, I2C, SIO, LIN, CAN).

The size of on-chip memory can be configured according to different part number and the package is available in LQFP and BGA, shown in Table 1

Table 1. FM3 Product List

Product	Flash	SRAM	Package
MB9BF504N/R	256kB	32kB	N: LQFP-100/BGA-112 R: LQFP-120
MB9BF505N/R	384kB	48kB	N: LQFP-100/BGA-112 R: LQFP-120
MB9BF506N/R	512kB	64kB	N: LQFP-100/BGA-112 R: LQFP-120

1.3 About USB Flash Loader Demo

In the demo, the user can download the demo code onto the board to check the result (display the user code content and communicate with the PC with USB as virtual com).

1.4 About Document

This document mainly introduces the operation process.

2 USB Flash Loader Demo System Components

1. IAR 6.XX: download the USB Flash Loader (MCU) onto the board.
2. USB Flash Loader (MCU) Project: the boot loader program.
3. USB Flash Loader (PC): the program running on the PC to communicate with the board to process the user command. (disk1)
4. User code: demo code. (VirtualCom.bin and VirtualCom.hex)

3 USB Flash Loader Overview

1. First of all, the user must download the USB Flash Loader (MCU) program onto the board by IAR.
2. Then the user can contact the PC with the board to operate the board.
3. After downloading the user code, the user can run the code.

4 USB Flash Loader Usage Step

4.1 Interface Introduction

(Due to this application is derived from UART Updater, so in some place you can find the word: UARTUpdater, it's no problem.)

OBSOLETE

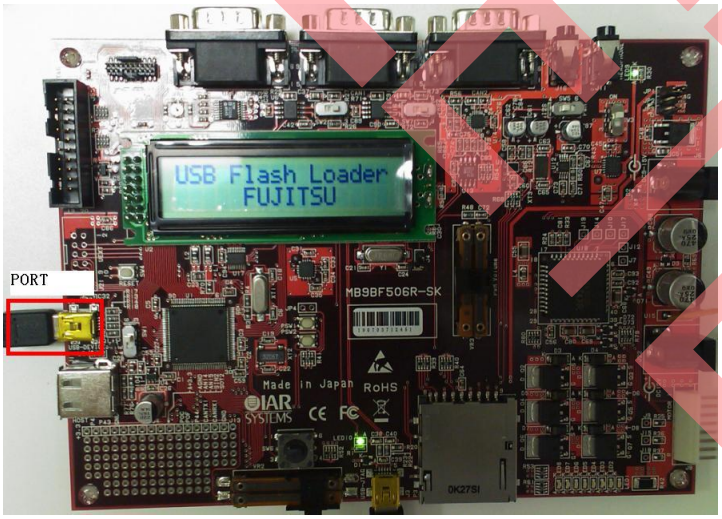
Figure 1. Start Up Interface



Operation steps:

1. Connect the USB line between the board and the PC as following. (the USB device port is identified as red frame.

Note: This port must be connected before power on the board



2. Power on the board.
3. Start the USBFlashLoader (PC) software.
4. After start the program, the user must select the valid COM port.

OBSOLETE

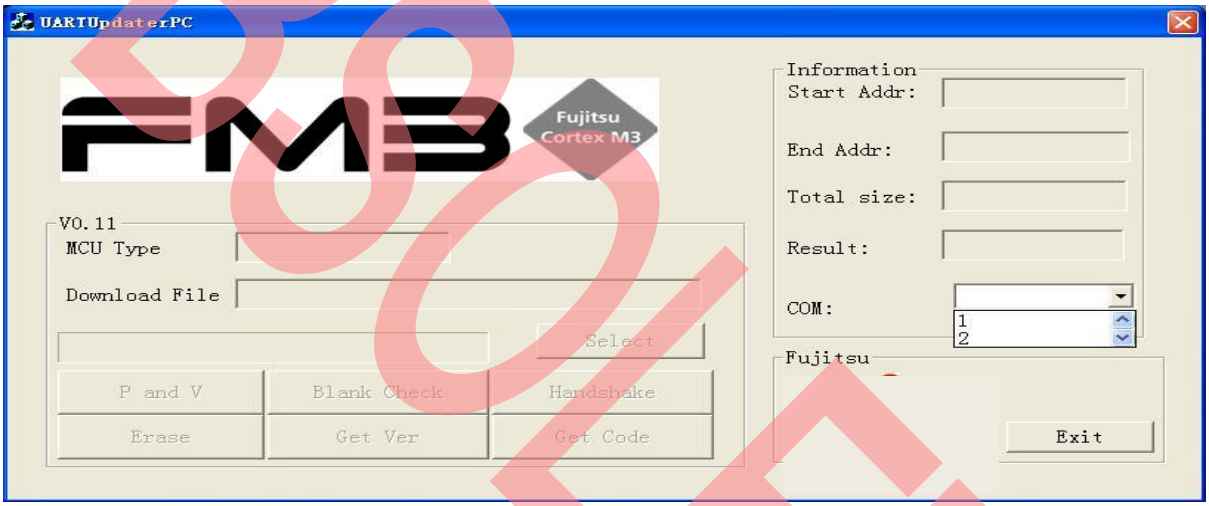
5. The program will init the selected valid COM port, and the ‘Handshake’ button can be clicked.
6. Click the ‘Handshake’ button to start the working process between the PC and the board.
7. If connection OK, the MCU information will be displayed, and the ‘Blank Check’/’Erase’/’Get Version’/’Get Code’ buttons can be clicked.
8. The user can select the downloaded file (bin or hex format) by select ‘Select’ button, then click ‘P and V’ button to download the file onto the board and get the program/verify result.

Note: If there is no response got from the board (i.e. click the ‘Blank’ button to check the user code area of the board, but there is no response got in the ‘Result’ edit box), the user can start the step 1 – 6 to re-connect the PC with the board.

4.2 COM Select

Select the COM port by select the combo list behind ‘COM:’

Figure 2. COM Port Select



If COM port init OK

Figure 3. COM Port Init OK



If invalid COM port is selected

Figure 4. COM Port Init NG



OBSOLETE

4.3 Connection

After the COM port init OK, the user shall connect the PC with the board at first, so the ‘Handshake’ can be clicked.

Figure 5. After COM Port Init OK



Click the ‘Handshake’ button, if COM init OK

Figure 6. Handshake OK



OBSOLETE

If can't get the response from the board within 5 seconds, display the overtime message

Figure 7. Handshake Overtime



4.4 Blank Check

After connection OK, click the 'Blank Check' button to check whether there exists the data in the user code area on the board, check the 'Result' text item.

Figure 8. User code area is blank



OBSOLETE

Figure 9. User code area is not blank



4.5 Erase

After connection OK, click the ‘Erase’ button to erase the user code area of the board, check the ‘Result’ text item.

Figure 10. Erasing



OBSOLETE

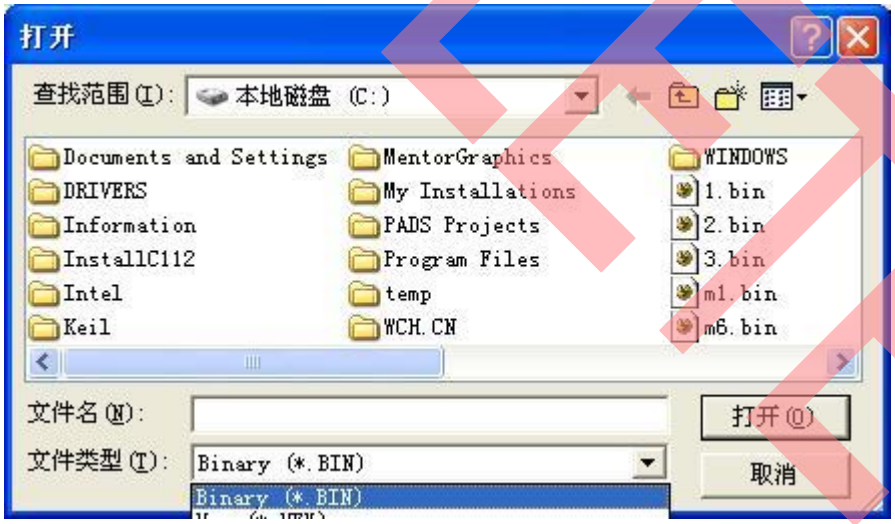
Figure 11. Erase OK



4.6 File Select

After connection OK, click the ‘Select’ button to select the downloaded file.

Figure 12. Select file



OBSOLETE

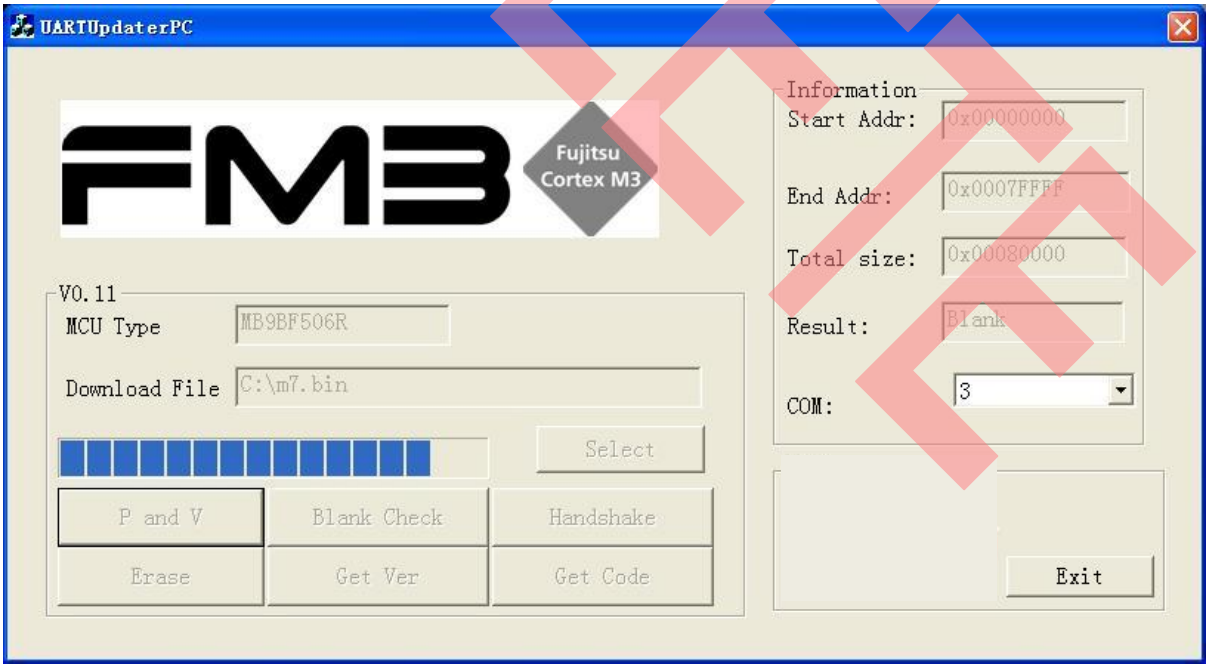
Figure 13. File slected



4.7 Program and Verify

After the file is selected, click the ‘P and V’ to download the file onto the board.

Figure 14. Programming



OBSOLETE

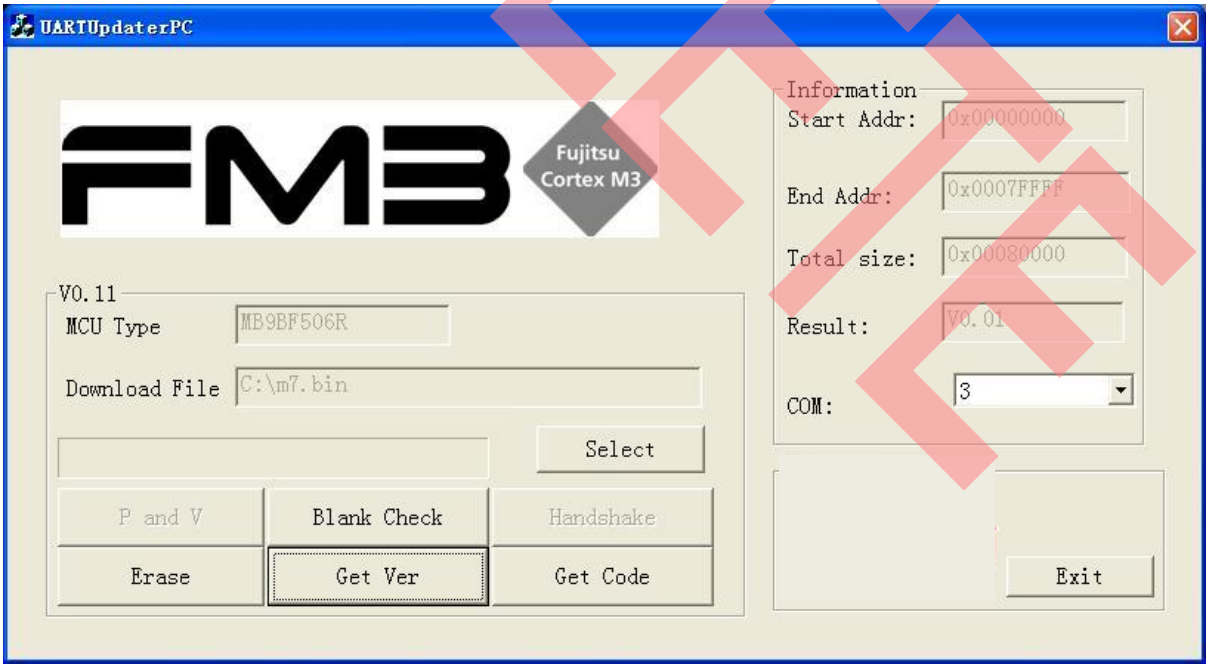
Figure 15. Program OK



4.8 Get Version

After connection OK, click the ‘Get Ver’ button to get the user code version information.

Figure 16. Get Version



OBSOLETE

4.9 Get Code

Note: Not fully supported in this version!)

After connection OK, click the 'Get Code' button to get the program at the user code area.

Figure 17. Getting Code



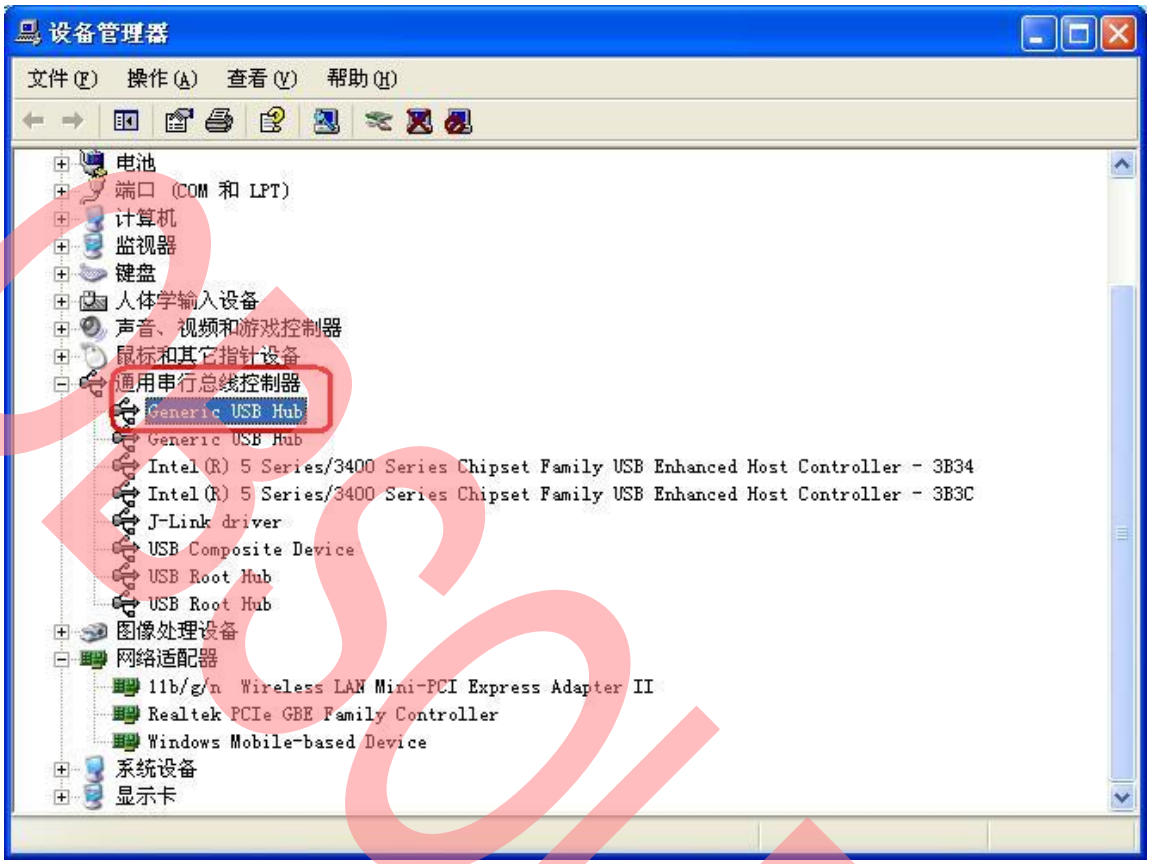
Figure 18. Code got OK



Note: Due to some reason (driver or some unexpected reason), sometimes maybe the connection is not OK, in this situation, the user can:

1. Power off → Power on
2. f after power off/on, the board still can't work, please check the 'Device Manager' to confirm whether the device is correctly recognized, if not, the user can stop/start the 'Generic USB Hub' of this connected USB port.

OBSOLETE


设备管理器
文件(F) 操作(A) 查看(V) 帮助(H)
电池
端口 (COM 和 LPT)
计算机
监视器
键盘
人体学输入设备
声音、视频和游戏控制器
鼠标和其它指针设备
通用串行总线控制器
Generic USB Hub
Generic USB Hub
Intel(R) 5 Series/3400 Series Chipset Family USB Enhanced Host Controller - 3B34
Intel(R) 5 Series/3400 Series Chipset Family USB Enhanced Host Controller - 3B3C
J-Link driver
USB Composite Device
USB Root Hub
USB Root Hub
图像处理设备
网络适配器
11b/g/n Wireless LAN Mini-PCI Express Adapter II
Realtek PCIe GBE Family Controller
Windows Mobile-based Device
系统设备
显示卡

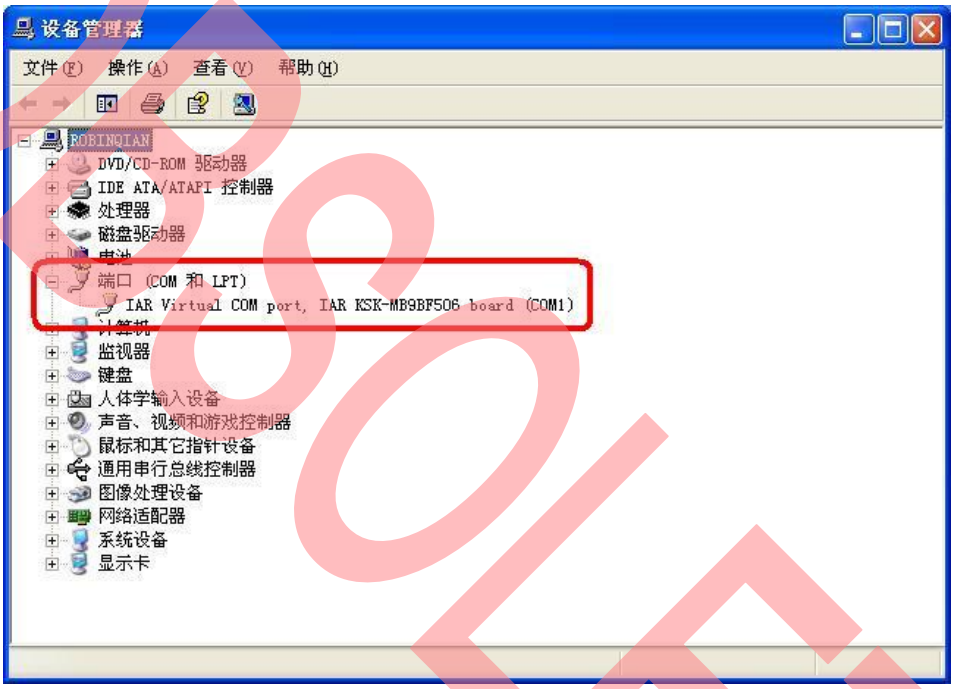
OBSOLETE

4.10 Preparation

4.10.1 Driver installation

Due to in this application, the board is worked as a USB virtual com device, so the user must install the correct driver on the working PC before using the flash load function. Please install the 'iarvircomport.inf' and note that the driver only supports the WinXP (Win2000).

After the correct installation, if connect the board and the PC with USB line, then power on, you can find this device in the 'Device Manager'



4.10.2 Program preparation

Please use the IAR to download the USB Flash Loader bin code onto the board.

5 Example Project

5.1 Components

The package shall include:

USB Flash Loader (MCU) Project

USB Flash Loader (PC) installation files (disk1)

User code (VirtualCom.bin and VirtualCom.hex)

USB line

IAR 6.XX

MB9BF506R-SK board

OBSOLETE

5.1.1 USB Flash Loader (MCU)

After power on,

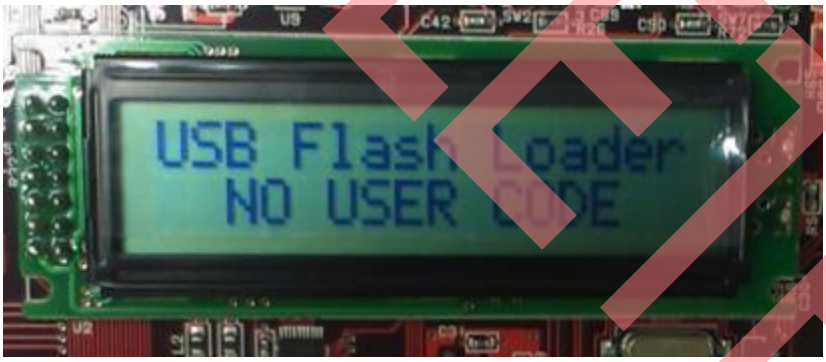
1. USB line connected before power on, LCD display as following:



2. USB line not connected before power on with valid user code, LCD display as following:



3. USB line not connected before power on with invalid user code, LCD display as following:



Note: Please notice use the correct USB port of the board.

5.1.2 USB Flash Loader (PC)

After start the program, please operate the software as Chapter 4 described.

5.1.3 User Code

The function of the user code:

1. Display the following content on the LCD

OBSOLETE



2. The user can start the COM debug tools (configured as: 115200/8 bits/1 stop bit/None parity/custom flow control) and send some content to the board, the board will send back the received data to the PC.

5.2 Usage Scenario

5.2.1 Preparation

1. Prepare the board
2. Download the USB Flash Loader (MCU) onto the board
3. Connect the PC with the board
4. Start the USB Flash Loader (PC) software on the PC
5. Select the valid COM port
6. Click the 'Handshake' button; power on/reset the board **within 5 seconds**
7. Connection OK
8. Click the 'Blank Check' button to check whether the user code area of the board is blank, if not blank, click the 'Erase' button to erase the user code area
9. Select the user code (bin/hex format are supported) (usercode.bin/usercode.hex)
10. Click the 'P and V' to download the program and check the result

5.3 User code make

1. Prepare the normal project
2. Add the following code at the start of Reset Handler

```
LDR    R0,=0xE000ED08
LDR    R1,=0x4000
STR    R1,[R0]
```

3. Define the section for storing the version information

In .c file, add

```
#pragma location = ".INFORSEC"
const char sVersion[16] = {'V','0','.','0','1', 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0};
```

in .icf file, add

```
place at address mem:0x00004100 { section .INFORSEC};
```

4. Output can be selected as .hex or .bin

OBSOLETE

6 Document History

Document Title: AN205237 - FM3 MB9B500 Microcontroller with USB Flash Loader Demonstration System

Document Number: 002-05237

Revision	ECN	Orig. of Change	Submission Date	Description of Change
**	-	HUAL	10/24/2011	Initial Release
			10/26/2011	Refine the section 4.1
*A	5043575	HUAL	06/28/2016	Migrated Spansion Application Note from MCU-AN-510017-E-11 to Cypress format. Links to Hardware and firmware doesn't exist and this AN to be Obsolete.

OBSOLETE

Worldwide Sales and Design Support

Cypress maintains a worldwide network of offices, solution centers, manufacturer's representatives, and distributors. To find the office closest to you, visit us at Cypress Locations.

Products

ARM® Cortex® Microcontrollers	cypress.com/arm
Automotive	cypress.com/automotive
Clocks & Buffers	cypress.com/clocks
Interface	cypress.com/interface
Lighting & Power Control	cypress.com/powerpsoc
Memory	cypress.com/memory
PSoC	cypress.com/psoc
Touch Sensing	cypress.com/touch
USB Controllers	cypress.com/usb
Wireless/RF	cypress.com/wireless

PSoC® Solutions

PSoC 1 | PSoC 3 | PSoC 4 | PSoC 5LP

Cypress Developer Community

Forums | Projects | Videos | Blogs | Training | Components

Technical Support

cypress.com/support

OBSOLETE

PSoC is a registered trademark and PSoC Creator is a trademark of Cypress Semiconductor Corporation. All other trademarks or registered trademarks referenced herein are the property of their respective owners.

Cypress Semiconductor
198 Champion Court
San Jose, CA 95134-1709

Phone : 408-943-2600
Fax : 408-943-4730
Website : www.cypress.com

© Cypress Semiconductor Corporation, 2011-2016. This document is the property of Cypress Semiconductor Corporation and its subsidiaries, including Spansion LLC ("Cypress"). This document, including any software or firmware included or referenced in this document ("Software"), is owned by Cypress under the intellectual property laws and treaties of the United States and other countries worldwide. Cypress reserves all rights under such laws and treaties and does not, except as specifically stated in this paragraph, grant any license under its patents, copyrights, trademarks, or other intellectual property rights. If the Software is not accompanied by a license agreement and you do not otherwise have a written agreement with Cypress governing the use of the Software, then Cypress hereby grants you a personal, non-exclusive, nontransferable license (without the right to sublicense) (1) under its copyright rights in the Software (a) for Software provided in source code form, to modify and reproduce the Software solely for use with Cypress hardware products, only internally within your organization, and (b) to distribute the Software in binary code form externally to end users (either directly or indirectly through resellers and distributors), solely for use on Cypress hardware product units, and (2) under those claims of Cypress's patents that are infringed by the Software (as provided by Cypress, unmodified) to make, use, distribute, and import the Software solely for use with Cypress hardware products. Any other use, reproduction, modification, translation, or compilation of the Software is prohibited.

TO THE EXTENT PERMITTED BY APPLICABLE LAW, CYPRESS MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARD TO THIS DOCUMENT OR ANY SOFTWARE OR ACCOMPANYING HARDWARE, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. To the extent permitted by applicable law, Cypress reserves the right to make changes to this document without further notice. Cypress does not assume any liability arising out of the application or use of any product or circuit described in this document. Any information provided in this document, including any sample design information or programming code, is provided only for reference purposes. It is the responsibility of the user of this document to properly design, program, and test the functionality and safety of any application made of this information and any resulting product. Cypress products are not designed, intended, or authorized for use as critical components in systems designed or intended for the operation of weapons, weapons systems, nuclear installations, life-support devices or systems, other medical devices or systems (including resuscitation equipment and surgical implants), pollution control or hazardous substances management, or other uses where the failure of the device or system could cause personal injury, death, or property damage ("Unintended Uses"). A critical component is any component of a device or system whose failure to perform can be reasonably expected to cause the failure of the device or system, or to affect its safety or effectiveness. Cypress is not liable, in whole or in part, and you shall and hereby do release Cypress from any claim, damage, or other liability arising from or related to all Unintended Uses of Cypress products. You shall indemnify and hold Cypress harmless from and against all claims, costs, damages, and other liabilities, including claims for personal injury or death, arising from or related to any Unintended Uses of Cypress products.

Cypress, the Cypress logo, Spansion, the Spansion logo, and combinations thereof, PSoC, CapSense, EZ-USB, F-RAM, and Traveo are trademarks or registered trademarks of Cypress in the United States and other countries. For a more complete list of Cypress trademarks, visit cypress.com. Other names and brands may be claimed as property of their respective owners.