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Fujitsu Semiconductor (Shanghai) Co., Ltd.
Application Note

MCU-AN- 500046-E-13

F²MC-8FX FAMILY

8-BIT MICROCONTROLLER

MB95200/260 SERIES

DIP8/DIP16/DIP24 PROGRAMMER ADAPTOR

APPLICATION NOTE

Revision History

Date	Author	Change of Records
2009-5-11	Edison Zhang	V1.0, First draft
2009-11-02	Edison Zhang	V1.1, Add DIP8/DIP24 PGM adaptor usage
2009-11-03	Edison Zhang	V1.2, Modify
2009-11-06	Edison Zhang	V1.3, Modify

This manual contains 22 pages.

CONTENTS

1 Introduction

MB95200/260 series DIP8/DIP16/DIP24 PGM adaptor is developed mainly as an independent on-board programming and debugging tool for MB95200/260 series DIP8/DIP16/DIP24 package MCU. It can also be used with MB95200H/210H series EV-board V1.6.

The DIP8/DIP16/DIP24 PGM adaptor is shown as in Figure 1.1, Figure1.2 and Figure1.3 below. The socket is used to hold a MB95200/260 series DIP8/DIP16/DIP24 package MCU. The Part Number of each adaptor is shown in the table below.

Adaptor Name	**Part Number**	**Support Package**
DIP8 PGM Adaptor	FMCDC-MB95200-PGMA-03008	DIP8
DIP16 PGM Adaptor	FMCDC-MB95200-PGMA-03016	DIP16
DIP24 PGM Adaptor	FMCDC-MB95200-PGMA-04024	DIP24

Notes:

The DIP8 socket is replaced by DIP16 socket in the DIP8 PGM adaptor, the below 8 pins are plugged up to avoid misplacing.

The DIP24 socket is replaced by DIP28 socket in the DIP24 PGM adaptor, the below 4 pins are plugged up to avoid misplacing.

Figure 1-1: MB95200/260 Series DIP8 PGM Adaptor

Figure 1-2: MB95200/260 Series DIP16 PGM Adaptor

Figure 1-3: MB95200/260 Series DIP24 PGM Adaptor

2 Application Environment

This chapter introduces application environment for MB95200/260 series DIP8/DIP16/DIP24 PGM adaptor.

2.1 Mother Board

The mother board of DIP8/DIP16/DIP24 PGM adaptor is MB95200H/210H series EV-board V1.6 as shown in the picture below. It is enclosed in the MB95200 series MCU Starter Kit package (part number: MB2146-410/420-01-E).

Figure 2-1: MB95200H/210H Series EV-board V1.5

2.2 Debugging Tool

The debugging tool is BGMA (BGM Adaptor) and the model number is MB2146-08-E as shown in the picture below. It is enclosed in the MB95200 series MCU Starter Kit package (Part Number: MB2146-410/420-01-E).

Figure 2-2: BGM Adaptor

2.3 SOFTUNE

SOFTUNE is used as software development environment for programming and debugging. The current version is F2MC-8L/8FX SOFTUNE Workbench V30L31 as shown in the picture below. It is enclosed in the MB95200 series MCU Starter Kit package (part number: MB2146-410-01-E) or can be downloaded from the following website.

http://www.fujitsu.com/cn/fss/services/mcu/tools.html

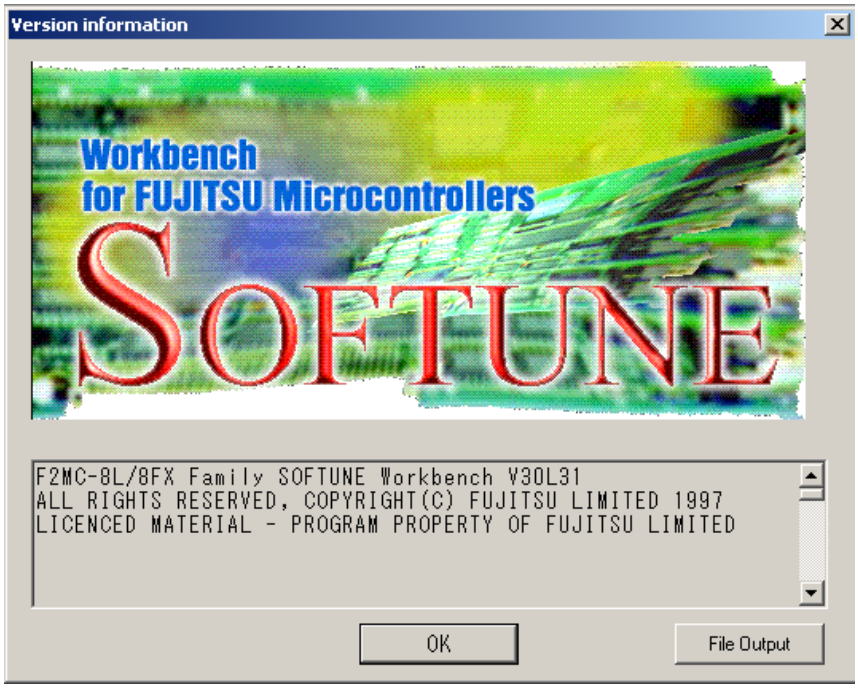

Figure 2-3: SOFTUNE Version

2.4 USB Programmer Software

The MB95200 series USB programmer is shown as below. It is enclosed in the MB95200 Series MCU Starter Kit package (part number: MB2146-410-01-E), or can be downloaded from the following website.

http://www.fujitsu.com/cn/fss/services/mcu/tools.html

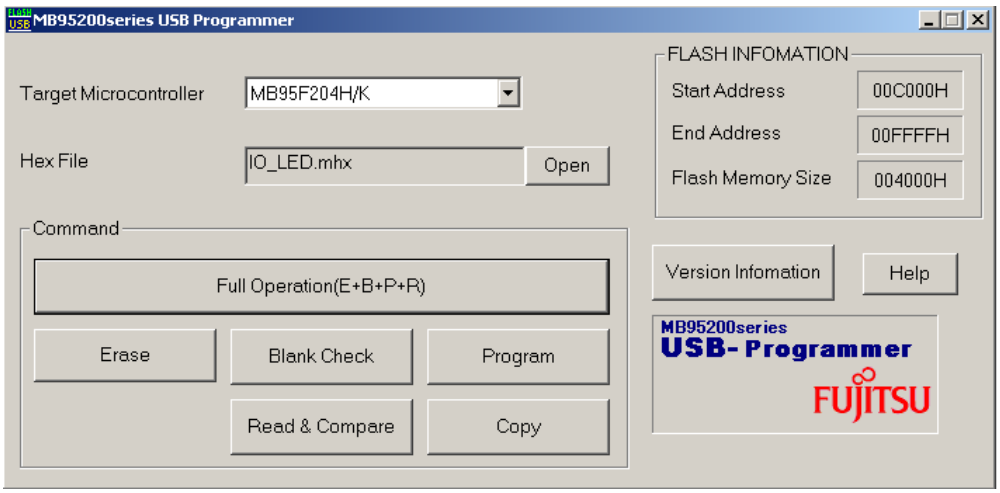

Figure 2-4: MB95200 Series USB Programmer

3 Hardware Connection

This chapter introduces hardware connection when it is used independently or with mother board.

MB95200/260 series DIP8/DIP16/DIP24 PGM adaptor can be used to program and debug independently or after being installed to the mother board. Hardware preparations for each case are described in Section 3.1and Section 3.2 respectively.

3.1 Independent Usage

When using MB95200/260 series DIP8/DIP16/DIP24 PGM adaptor independently for programming, we should fix MCU on the socket first (if MB95F204K is programmed, install it on DIP24 PGM adaptor; if MB95F213K is programmed, install it on DIP8 PGM adaptor). Then following steps should be implemented.

Notes:

For MB95F260/MB95F270/MB95F280 series MCU, R3 should be removed.

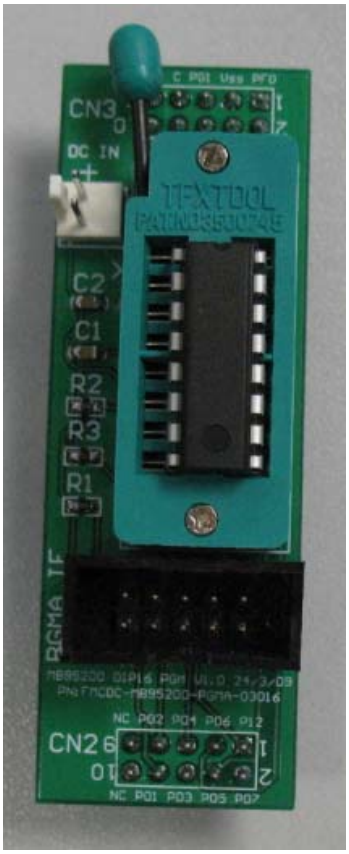

Figure 3-1: Independent Usage Preparation

(1) Connect BGMA to PC

(2) Connect PGM adaptor board to BGMA

(3) Power on the PGM adaptor board, the typical input voltage is 3.3V or 5V.

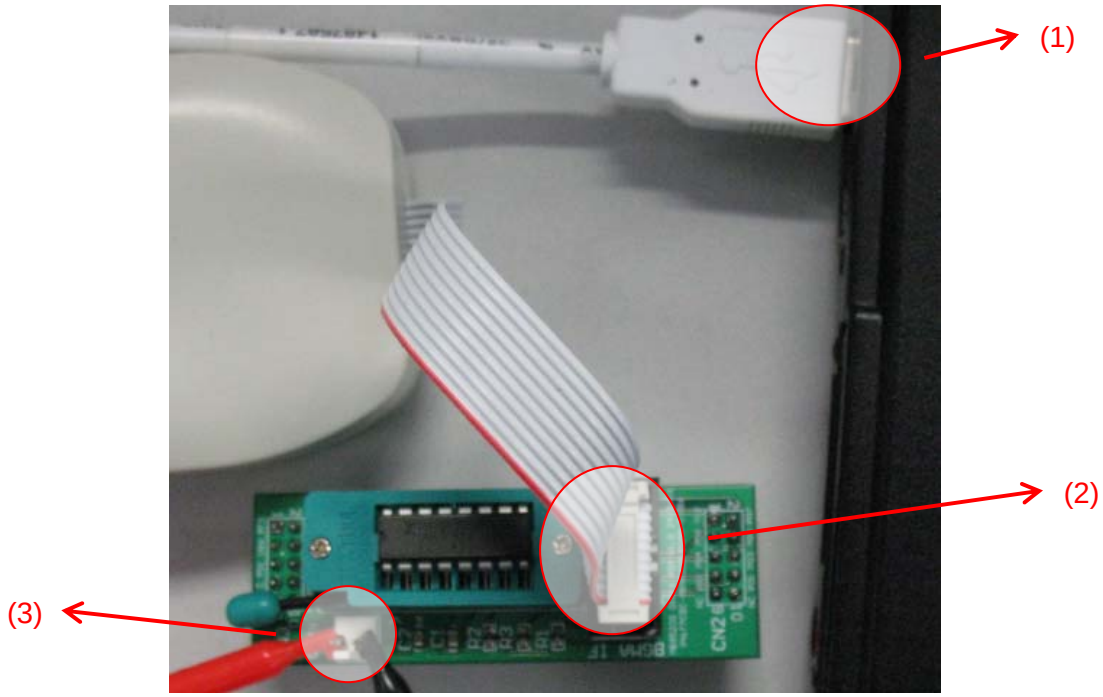

Figure 3-2: Hardware Connection for Independent Usage

3.2 Used with Mother Board

(1) MB95200H/210H series EV-board V1.6 is the mother board of DIP8/DIP16/DIP24 PGM adaptor board. First remove the MB95F204K chip mounted on the mother board.

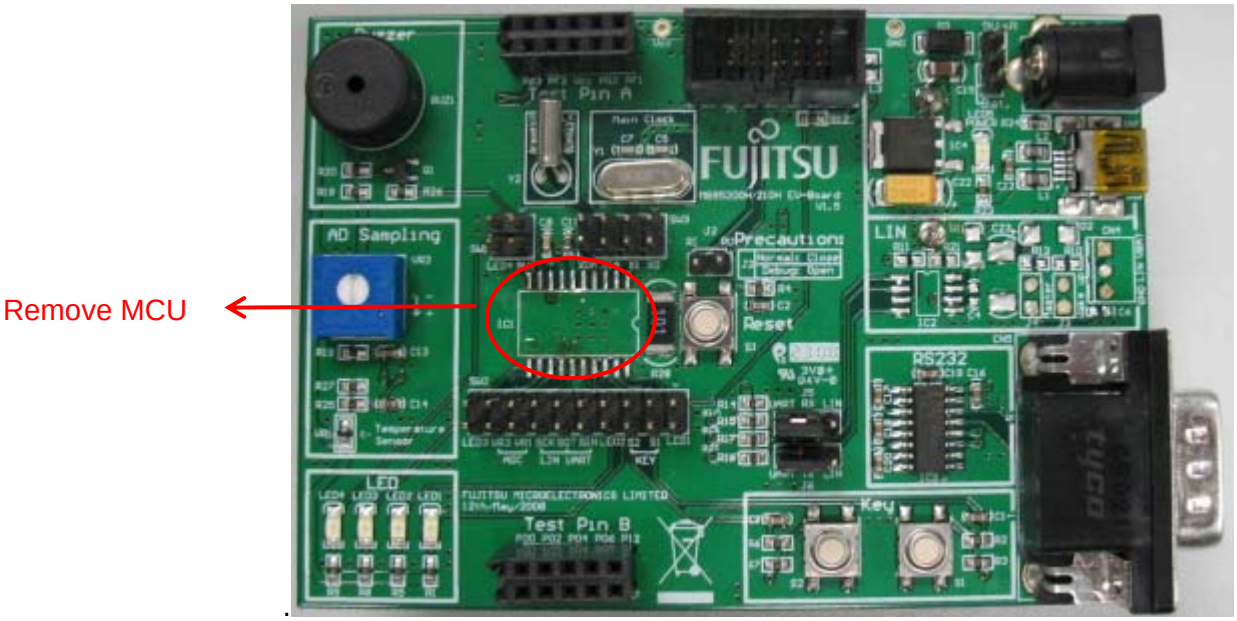

Figure 3-3: Remove MCU from Mother Board

(2) MB95200H/210H series EV-board has many general MCU peripheral modules, including LED, key, UART, buzzer, AD sample and so on. Many jumpers on the mother board are used to connect or disconnect MCU to/from peripheral modules. For general applications, these jumpers should be set short. For special applications, user needs to open these jumpers and test I/O ports of the 10-pin connector on the adaptor board. For more information on MB95200H/210H series EV-board, please refer to the Starter Kit MB2146-410/420-01-E User Manual.

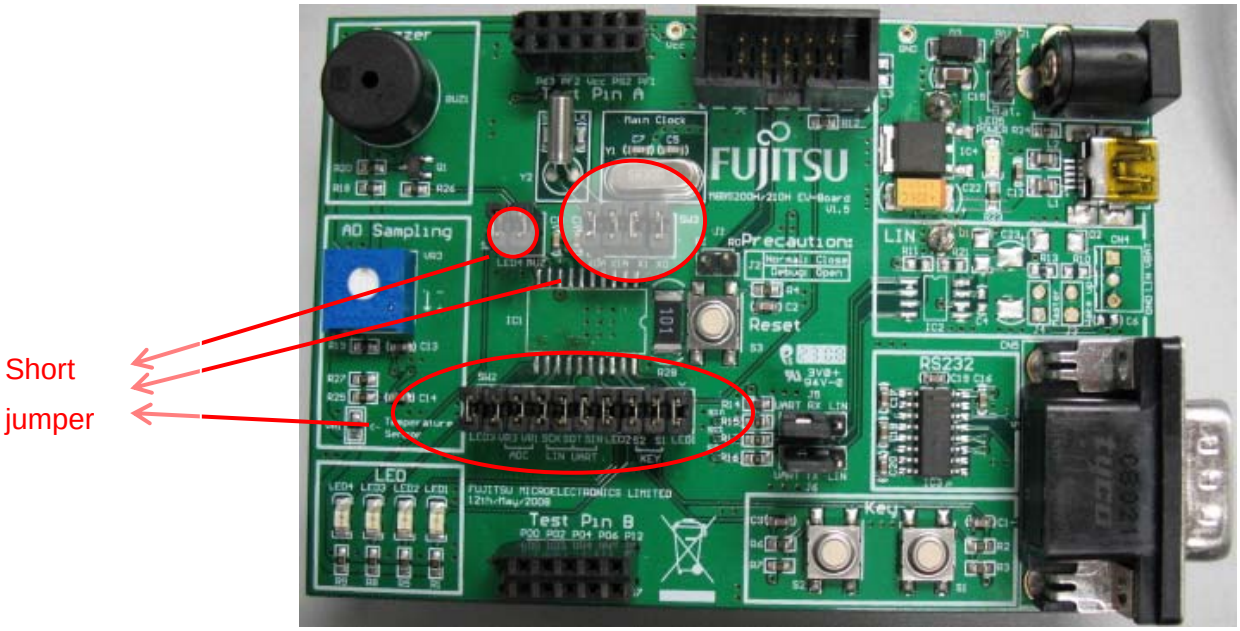

Figure 3-4: Short Jumpers on Mother Board

(3) Install the MB95F223K chip onto the DIP16 socket (if MB95F204K is programmed, install it on DIP24 PGM adaptor; if MB95F213K is programmed, install it on DIP8 PGM adaptor).

Notes:

For MB95F260/MB95F270/MB95F280 series MCU, R3 should be removed.

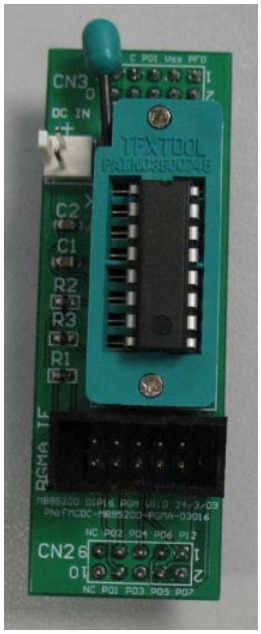

Figure 3-5: Place MCU on Adaptor Board

(4) Last, fix the adaptor board to the mother board.

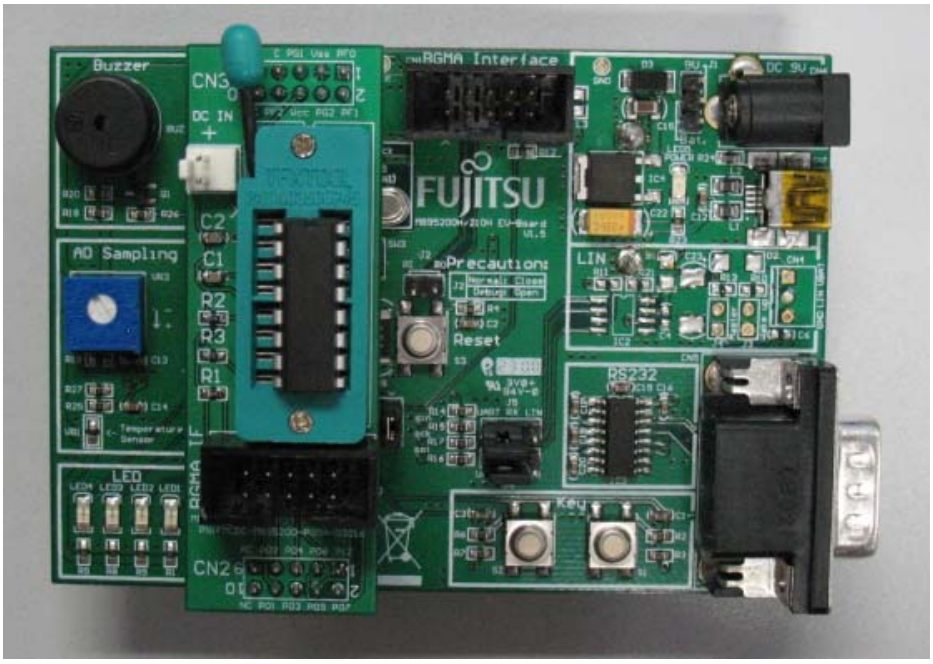

Figure 3-6: Fix Adaptor Board on the Mother Board

(5) Connect BGMA to PC

(6) Connect PGM adaptor board to BGMA

(7) Power on the EV-board

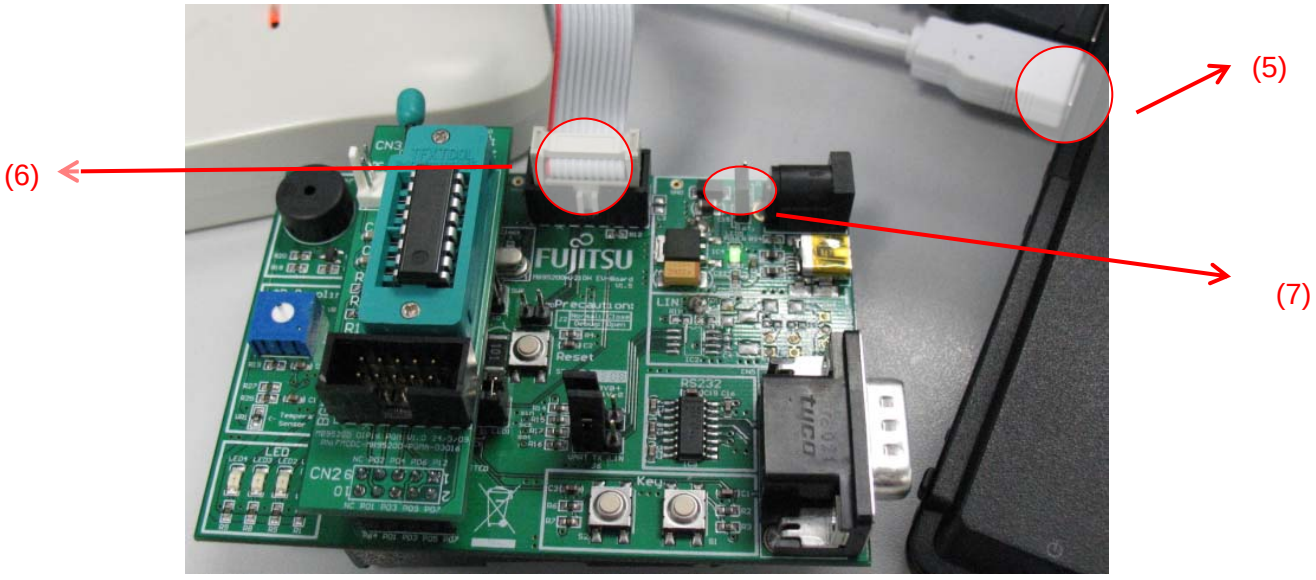

Figure 3-7: Process (5)-(7)

4 Program Function

This chapter introduces programming steps using either MB95200 series USB programmer or F^{2}MC-8L/8FX SOFTUNE Workbench V30L31.

MB95200 series MCU can be programmed through MB95200 series USB programmer or F^{2}MC-8L/8FX SOFTUNE Workbench V30L31. Section 4.1 and section 4.2 introduce programming steps with MB95200 series USB programmer and F^{2}MC-8L/8FX SOFTUNE Workbench V30L31 respectively.

4.1 Use MB95200 Series USB Programmer to Program

(1) Open MB95200 series USB programmer

(2) Select MCU type (MB95F204H/K for MB95F204K, MB95F223H/K for MB95F223K, MB95F213H/K for MB95F213K)

(3) Select Hex file by the path: Current project DIR\Debug\ABS

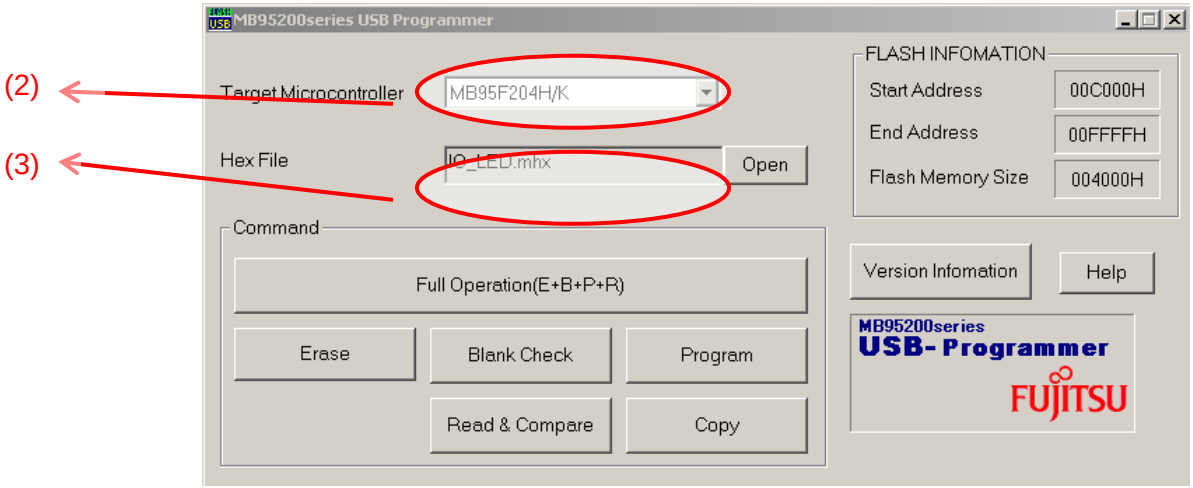

Figure 4-1: Select MCU Type and Hex File

(4) Click **Full Operation** to start programming.

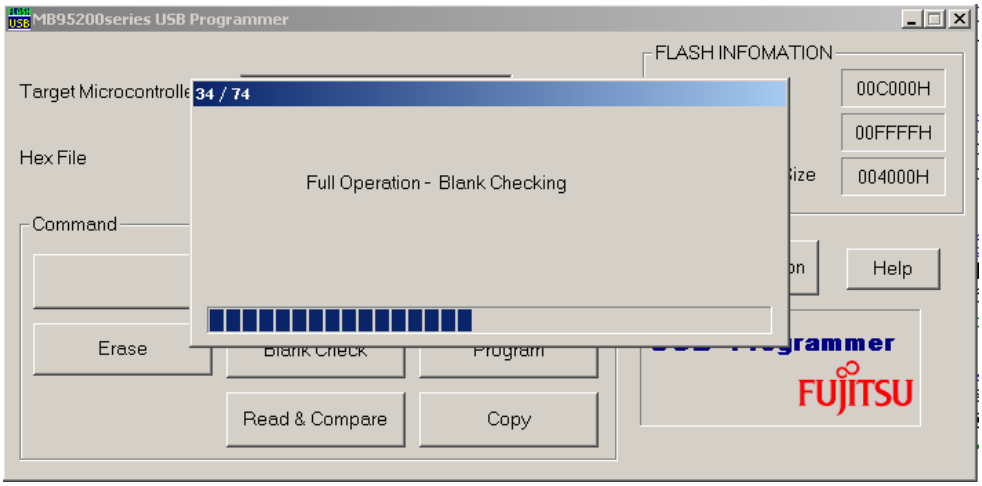

Figure 4-2: Click Full Operation

(5) The USB programmer also provides single operation, including Erase, Blank Check, Program, Read & Compare and Copy.

4.2 Use F²MC-8L/8FX SOFTUNE to Program

(1) Open a project (E.g. IO_LED) using SOFTUNE

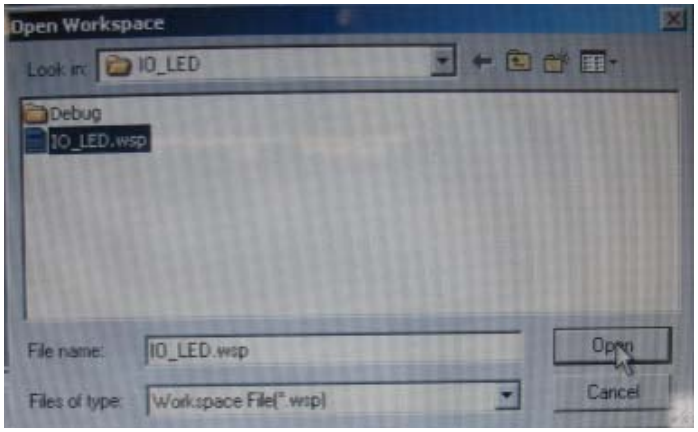

Figure 4-3: Open Demo Project

(2) As the original IO_LED demo is intended for MB95F204K MCU, **when MB95F223K is used on the DIP16 PGM adaptor or MB95F213K is used on the DIP8 PGM adaptor**, please change the MCU type to MB95F223K/MB95F213K in "Project/Setup Project…/MCU". **If MB95F204K is programmed on SOP20 PGM adaptor, the step (2) and (3) should be skipped.**

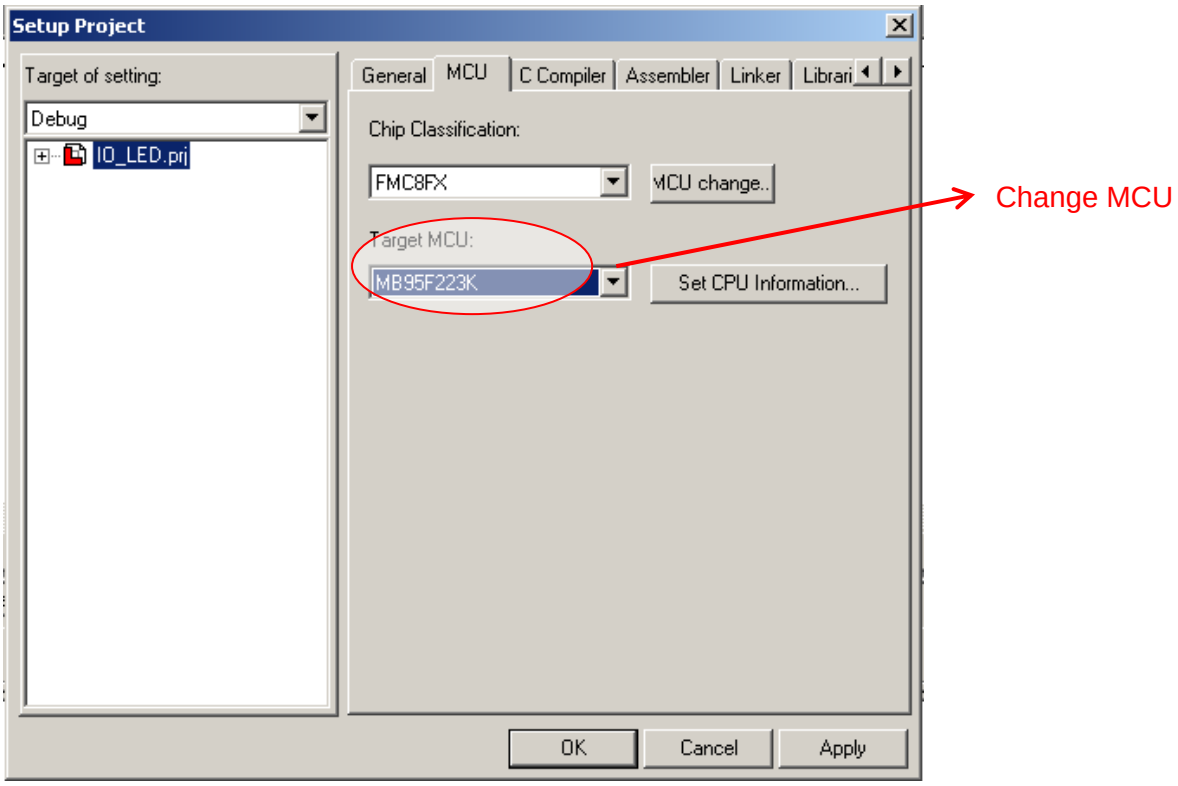

Figure 4-4: Set MCU Type

(3) Reset all sections as their settings are cleared after MCU is changed. In “Project/Setup Project…/Linker”, set **Disposition/Connection** in **Category**, then select **_INROM01** and click **Set Section…**. After that, a dialog window will pop up as shown in Figure 4.6 below. Set **Const (named @INIT)** and **Dirconst (named @DIRINIT)** as shown in Figure 4.7 and Figure 4.8.

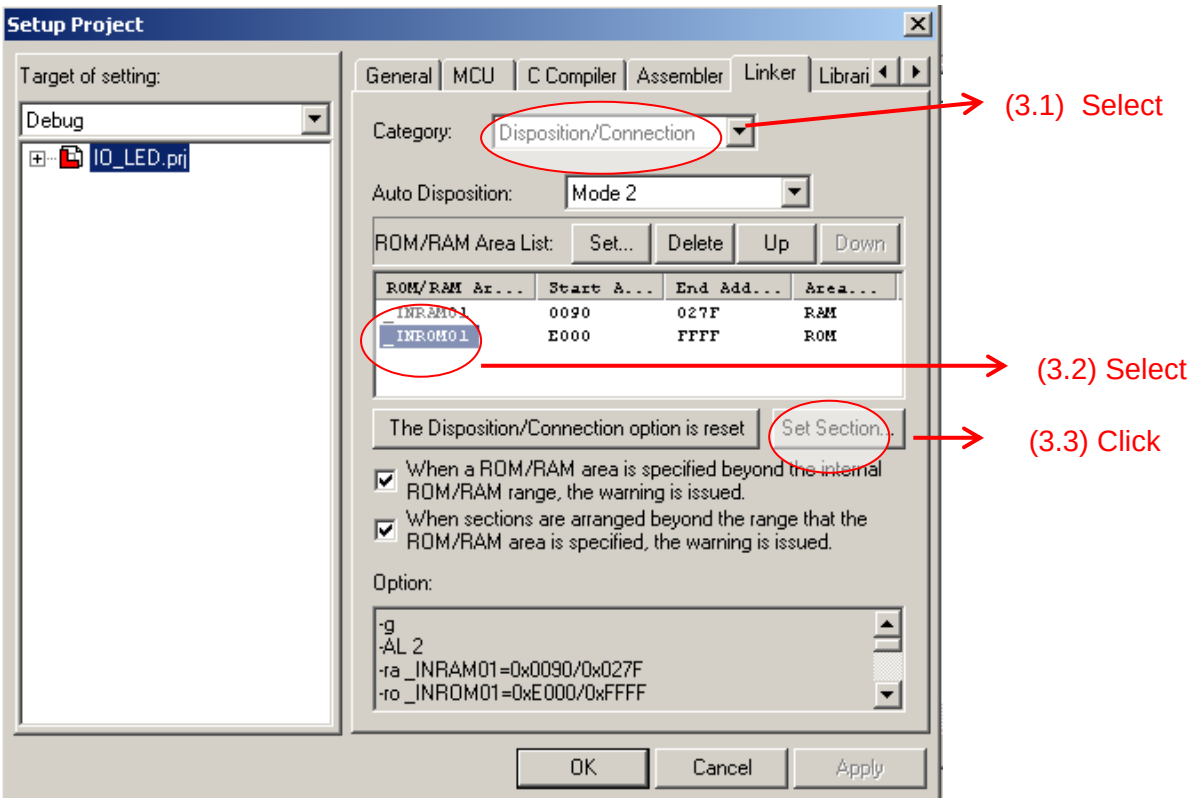

Figure 4-5: Disposition Display Window

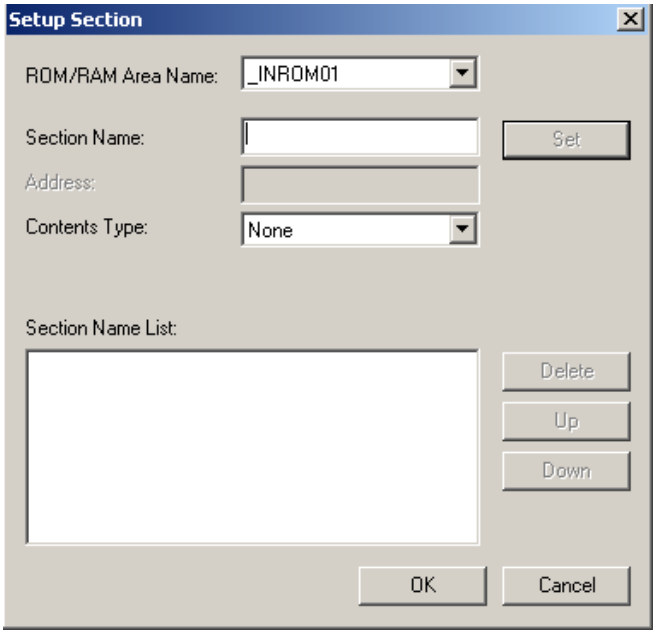

Figure 4-6: Section Setting Window

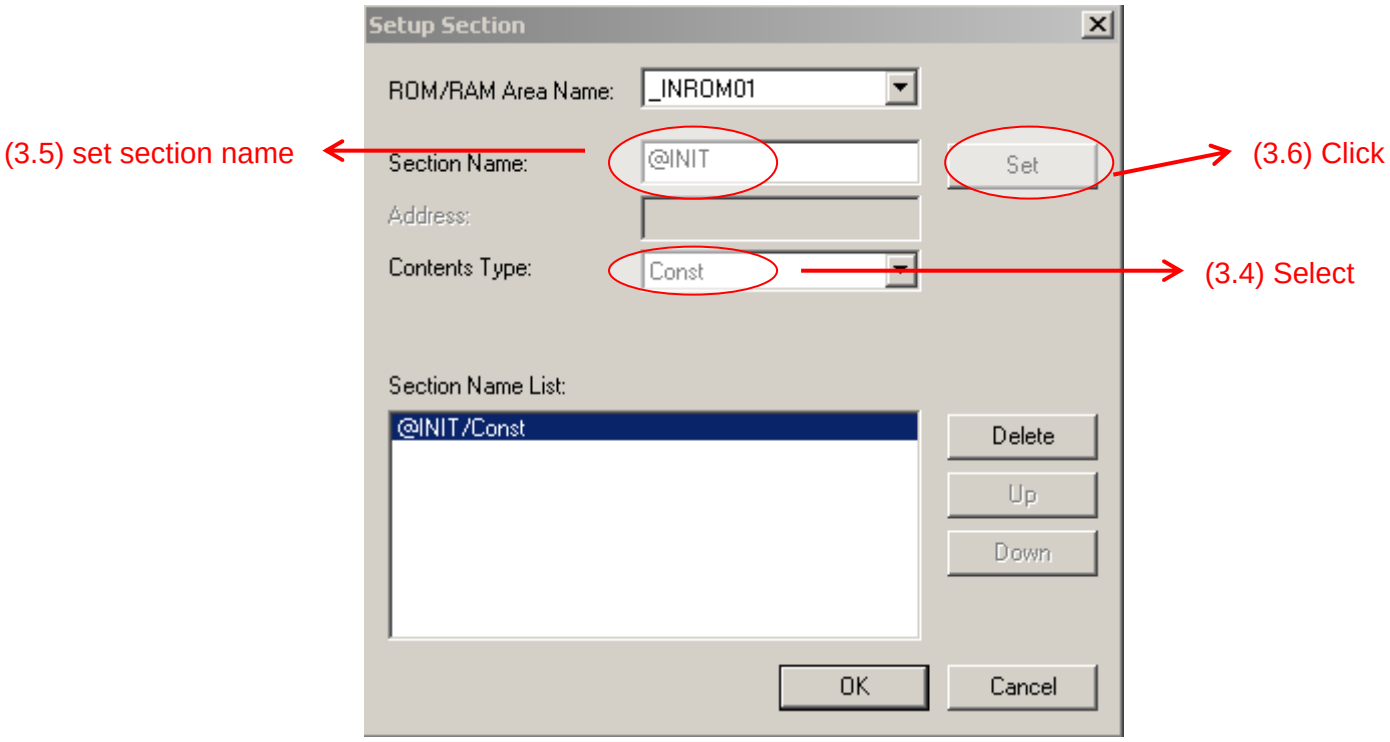

Figure 4-7: Set Const Section

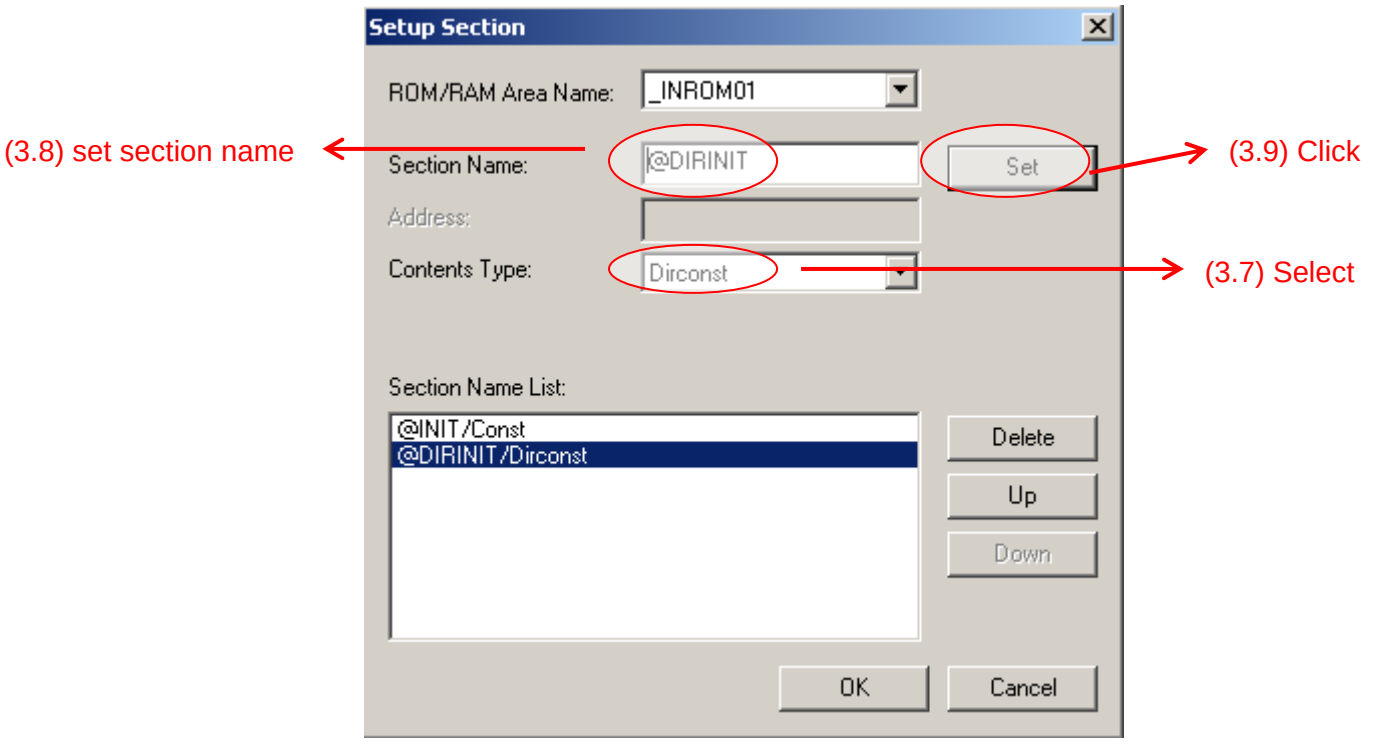

Figure 4-8: Set Dirconst Section

(4) Compile project.

(5) Start debugging.

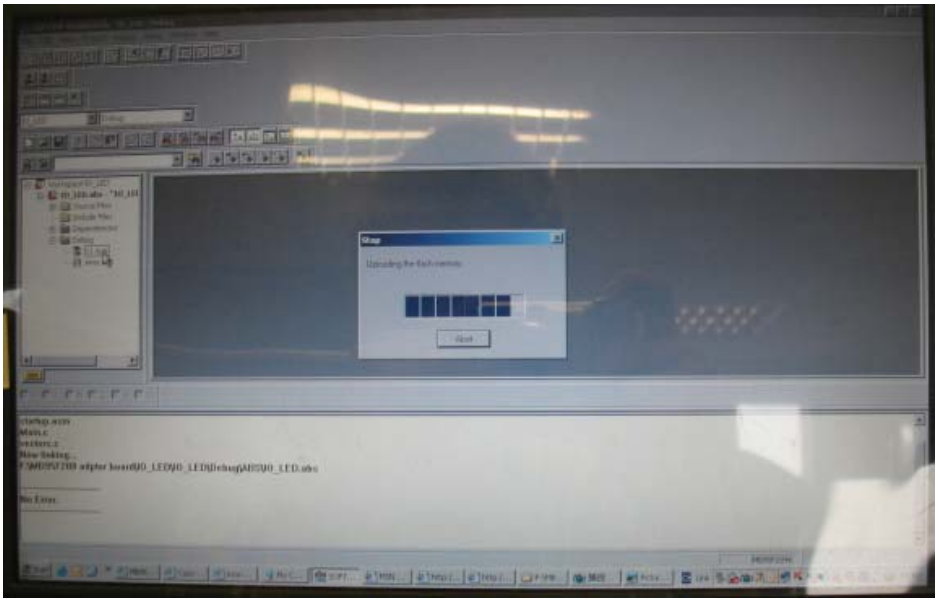

Figure 4-9: Start Debugging

(6) Run (code update).

(7) End debugging.

Notes:

SOFTUNE environment can also be used to debug, however if users only need to do programming, DO NOT set any breakpoint before step 6, or error code will be programmed.

5 Schematic

This chapter demonstrates schematic of each PGM adaptor.

5.1 DIP8 PGM Adaptor

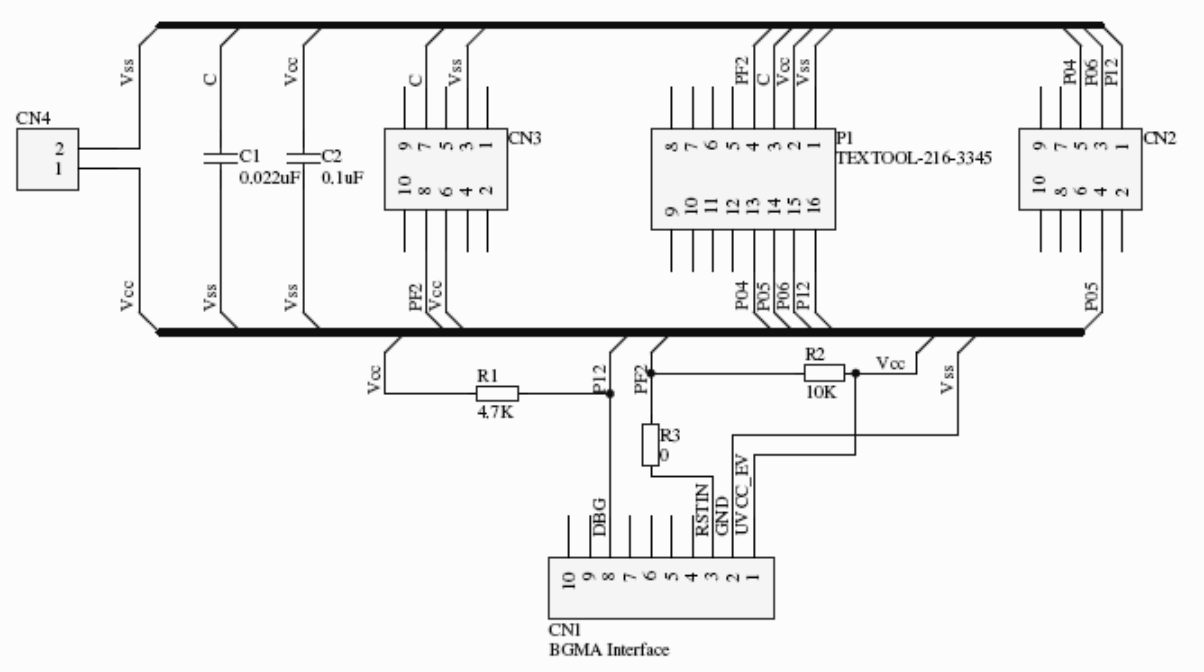

Figure 5-1: DIP8 PGM Adaptor Schematic

5.2 DIP16 PGM Adaptor

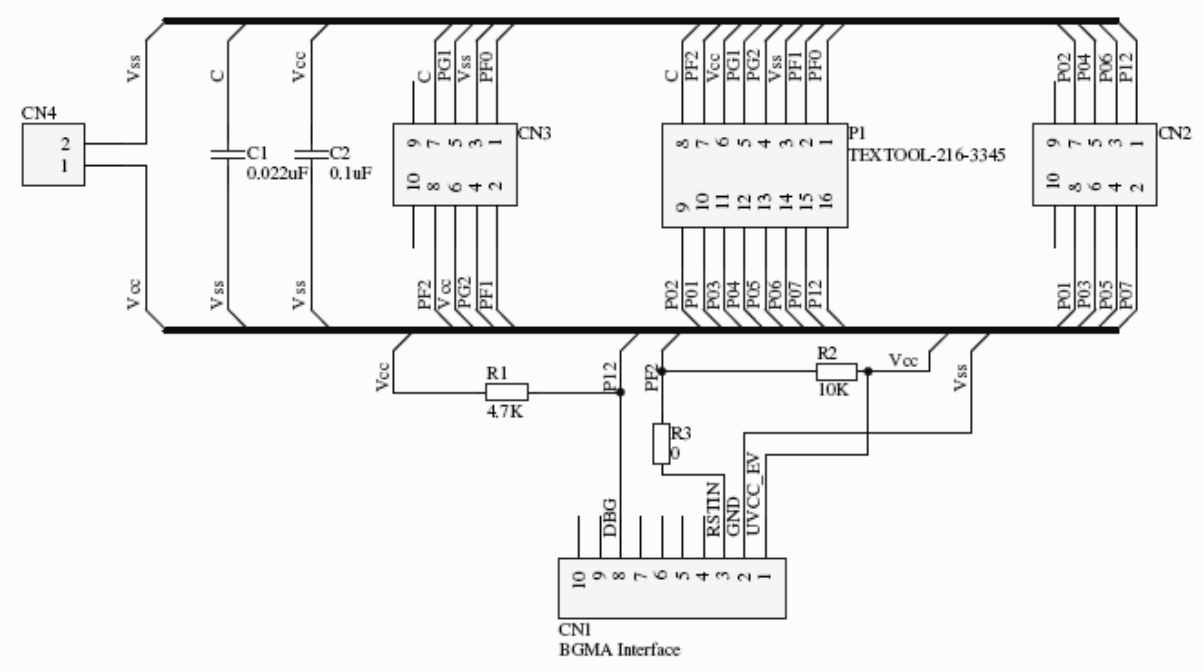

Figure 5-2: DIP16 PGM Adaptor Schematic

5.3 DIP24 PGM Adaptor

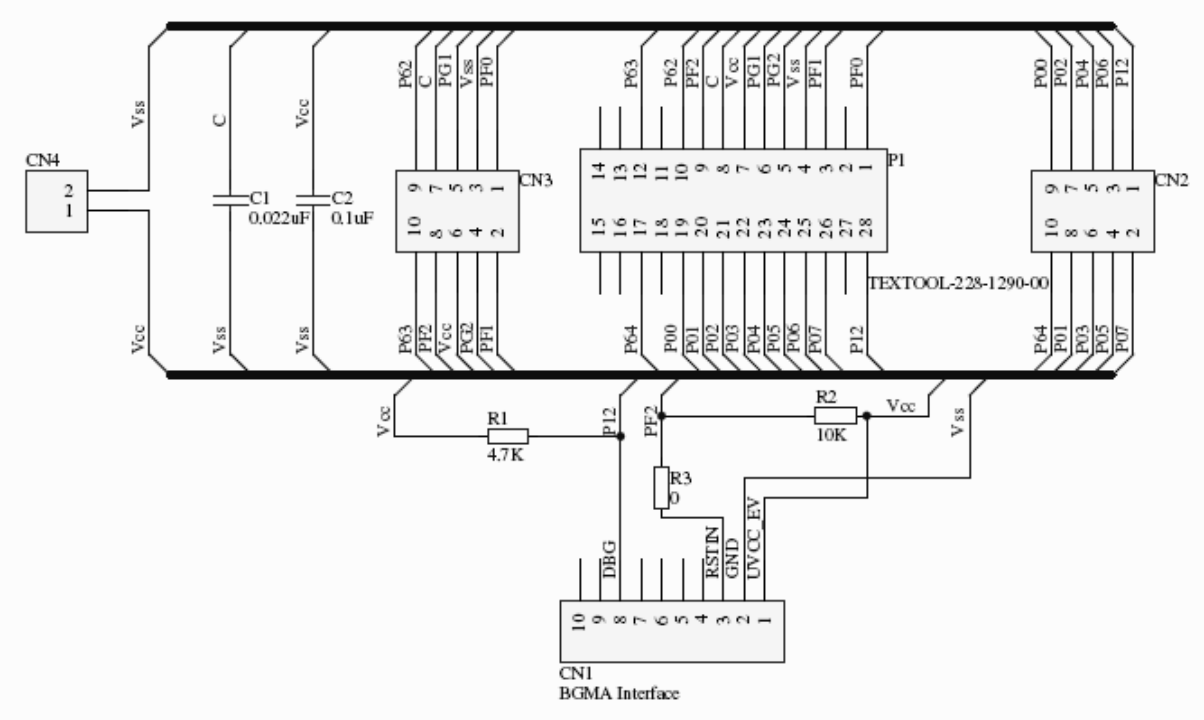

Figure 5-3: DIP24 PGM Adaptor Schematic

6 PN Definition Rule

The part number of PGM adaptor is FMCDC-MB95200-PGMA-0x0xx

0x: SOP→ 01, SSOP→ 02, DIP→ 03, SDIP→ 04, QFN→ 05, TSSOP-> 06

0xx: Pin count (e.g. 008 means 8pin MCU)

E.g. for DIP8/16/24 PGM adaptor, the PN is listed as below table.

Adaptor Name	**Part Number**
DIP8 PGM Adaptor	FMCDC-MB95200-PGMA-03008
DIP16 PGM Adaptor	FMCDC-MB95200-PGMA-03016
DIP24 PGM Adaptor	FMCDC-MB95200-PGMA-04024

7 PN List of Applicable MCUs

MCU Series	Part Number	Footprint
MB95220 series	MB95F223HPH-G-SNE2 MB95F223KPF-G-SNE2 MB95F222HPH-G-SNE2 MB95F222KPH-G-SNE2	DIP16
MB95210 series	MB95F214HPH-G-SNE2 MB95F214KPH-G-SNE2 MB95F213HPH-G-SNE2 MB95F213KPH-G-SNE2 MB95F212HPH-G-SNE2 MB95F212KPH-G-SNE2	DIP8
MB95200 series	MB95F204HP-G-SH-SNE2 MB95F204KP-G-SH-SNE2 MB95F203HP-G-SH-SNE2 MB95F203KP-G-SH-SNE2 MB95F202HP-G-SH-SNE2 MB95F202KP-G-SH-SNE2	DIP24
MB95260 series	MB95F262HP-G-SH-SNE2 MB95F262KP-G-SH-SNE2 MB95F263HP-G-SH-SNE2 MB95F263KP-G-SH-SNE2 MB95F264HP-G-SH-SNE2 MB95F264KP-G-SH-SNE2	DIP24
MB95270 series	MB95F272HPH-G-SNE2 MB95F272KPH-G-SNE2 MB95F273HPH-G-SNE2 MB95F273KPH-G-SNE2 MB95F274HPH-G-SNE2 MB95F274KPH-G-SNE2	DIP8
MB95280 series	MB95F282HPH-G-SNE2 MB95F282KPH-G-SNE2 MB95F283HPH-G-SNE2 MB95F283KPH-G-SNE2 MB95F284HPH-G-SNE2 MB95F284KPH-G-SNE2	DIP16

8 More Information

For more information on FUJITSU MB95200 products, please visit following websites:

English version:

http://www.fujitsu.com/cn/fsp/services/mcu/mb95/application_notes.html

Simplified Chinese Version:

http://www.fujitsu.com/cn/fss/services/mcu/mb95/application_notes.html

9 Appendix