

F²MC-8FX FAMILY

8-BIT MICROCONTROLLER

MB95200 SERIES

EASY KIT

FMCDC-MB95260H-EK-01

SETUP GUIDE



PREFACE

Thank you for purchasing the F2MC^{*1}-8FX Family Easy Kit: FMCDC-MB95260H-EK-01^{*2}.

This product is an Easy Kit for F2MC-8FX MB95200 Series MCU, which comes with F2MC-8FX Family MB95200 Series Easy BGM Adapter^{*3}, F2MC-8FX Family MB95200 Series Easy Evaluation Board^{*4} and F2MC-8L/8FX Family SOFTUNE Professional Pack Evaluation Version^{*5}.

This manual explains how to use the Easy Kit. Be sure to read this manual before using the product.

For mass production/evaluation MCUs for this product, consult with sales representatives or support representatives.

*1: F2MC is the abbreviation of FUJITSU Flexible Microcontroller.

*2: Referred below as the “Easy Kit”.

FMCDC-MB95260H-EK-01 is for MB95F260H series MCU.

*3: Referred below as the “Easy BGMA”.

*4: Referred below as the “Easy EV-Board”.

*5: Referred below as the “SOFTUNE”.

■ Handling and use

Handling and use of this product and notes regarding its safe use are described in the manuals for products bundled with the Easy Kit.

Follow the instructions in the manuals to use this product.

Keep this manual at hand so that you can refer to it anytime during use of this product.

■ Notice on this document



All information included in this document is current as of the date it is issued.

Such information is subject to change without any prior notice.

Please confirm the latest relevant information with the sales representatives.

■ Caution of the products described in this document

The following precautions apply to the product described in this manual.

 WARNING	<p>Indicates a potentially hazardous situation which, if not avoided appropriately, could result in death or serious injury and/or a fault in the user's system.</p>
Electric shock, Damage	<p>Before performing any operation described in this manual, turn off all the power supplies to the system. Performing such an operation with the power on may cause an electric shock or device fault.</p>
Electric shock, Damage	<p>Once the product has been turned on, do not touch any metal part of it. Doing so may cause an electric shock or device fault.</p>
 CAUTION	<p>Indicates the presence of a hazard that may cause a minor or moderate injury, damages to this product or devices connected to it, or may cause to loose software resources and other properties such as data, if the device is not used appropriately.</p>
Cuts, Damage	<p>Before moving the product, be sure to turn off all the power supplies and unplug the cables. Watch your step when carrying the product. Do not use the product in an unstable location such as a place exposed to strong vibration or a sloping surface. Doing so may cause the product to fall, resulting in an injury or fault.</p>
Cuts	<p>The product contains sharp edges that are left unavoidably exposed, such as jumper plugs. Handle the product with due care not to get injured with such pointed parts.</p>
Damage	<p>Do not place anything on the product or expose the product to physical shocks. Do not carry the product after the power has been turned on. Doing so may cause a malfunction due to overloading or shock.</p>
Damage	<p>Since the product contains many electronic components, keep it away from direct sunlight, high temperature, and high humidity to prevent condensation. Do not use or store the product where it is exposed to much dust or a strong magnetic or electric field for an extended period of time. Inappropriate operating or storage environments may cause a fault.</p>
Damage	<p>Use the product within the ranges given in the specifications. Operation over the specified ranges may cause a fault.</p>
Damage	<p>To prevent electrostatic breakdown, do not let your finger or other object come into contact with the metal parts of any of the connectors. Before handling the product, touch a metal object (such as a door knob) to discharge and any static electricity from your body.</p>
Damage	<p>Before turning the power on, in particular, be sure to finish making all the required connections. Furthermore, be sure to configure and use the product by following the instructions given in this document. Using the product incorrectly or inappropriately may cause a fault.</p>
Damage	<p>Always turn the power off before connecting or disconnecting any cables from the product. When unplugging a cable, unplug the cable by holding the connector part without pulling on the cable itself. Pulling the cable itself or bending it may expose or disconnect the cable core, resulting in a fault.</p>
Damage	<p>Because the structure of the MCU socket does not allow an evaluation MCU to be mounted in the incorrect orientation, be very careful of the orientation of the evaluation MCU when mounting it. Inserting the evaluation MCU in the wrong orientation may damage the MCU, causing the MCU to become faulty.</p>
Damage	<p>Because the product has no casing, it is recommended that it be stored in the original packaging. Transporting the product may cause a damage or fault. Therefore, keep the packaging materials and use them in case of for the re-shipment of the product.</p>

- The contents of this document are subject to change without notice. Customers are advised to consult with sales representatives before ordering.
- The information, such as descriptions of function and application circuit examples, in this document are presented solely for the purpose of reference to show examples of operations and uses of FUJITSU MICROELECTRONICS semiconductor device; FUJITSU MICROELECTRONICS does not warrant proper operation of the device with respect to use based on such information. When you develop equipment incorporating the device based on such information, you must assume any responsibility arising out of such use of the information. FUJITSU MICROELECTRONICS assumes no liability for any damages whatsoever arising out of the use of the information.
- Any information in this document, including descriptions of function and schematic diagrams, shall not be construed as license of the use or exercise of any intellectual property right, such as patent right or copyright, or any other right of FUJITSU MICROELECTRONICS or any third party or does FUJITSU MICROELECTRONICS warrant non-infringement of any third-party's intellectual property right or other right by using such information. FUJITSU MICROELECTRONICS assumes no liability for any infringement of the intellectual property rights or other rights of third parties which would result from the use of information contained herein.
- The products described in this document are designed, developed and manufactured as contemplated for general use, including without limitation, ordinary industrial use, general office use, personal use, and household use, but are not designed, developed and manufactured as contemplated (1) for use accompanying fatal risks or dangers that, unless extremely high safety is secured, could have a serious effect to the public, and could lead directly to death, personal injury, severe physical damage or other loss (i.e., nuclear reaction control in nuclear facility, aircraft flight control, air traffic control, mass transport control, medical life support system, missile launch control in weapon system), or (2) for use requiring extremely high reliability (i.e., submersible repeater and artificial satellite). Please note that FUJITSU MICROELECTRONICS will not be liable against you and/or any third party for any claims or damages arising in connection with above-mentioned uses of the products.
- Any semiconductor devices have an inherent chance of failure. You must protect against injury, damage or loss from such failures by incorporating safety design measures into your facility and equipment such as redundancy, fire protection, and prevention of over-current levels and other abnormal operating conditions.
- Exportation/release of any products described in this document may require necessary procedures in accordance with the regulations of the Foreign Exchange and Foreign Trade Control Law of Japan and/or US export control laws.
- The company names and brand names herein are the trademarks or registered trademarks of their respective owners.

© 2009 FUJITSU MICROELECTRONICS LIMITED

Contents

PREFACE	1
■ Handling and use	1
■ Notice on this document	1
■ Caution of the products described in this document	2
CONTENTS	4
1 PRODUCT OVERVIEW	5
1.1 Objective and Deliverable	5
1.2 System Block	5
1.3 Handling Precautions	5
1.4 Feature	6
1.5 Hardware Setup	6
2 EASY KIT MANUAL	7
2.1 Easy Kit Overview	7
2.2 Function List	7
2.3 Easy Kit Interface Description	8
2.4 Easy Kit USB Configuration	9
2.5 Easy Kit Mode Setting	12
3 EASY KIT SCHEMATIC	13
4 SAMPLE CODE MANUAL	14
4.1 Topic List	14
4.2 Project Structure	15
4.3 Source Code File Description	16
4.3.1 Header Files	16
4.3.2 Startup.asm File	17
4.3.3 Vectors.c File	18
4.3.4 Main.c File	18
5 DEVELOPMENT PLATFORM QUICK START	19
5.1 Tools Setup Sequence	19
5.2 Open Project and Start Debug	19
5.3 Operation Precautions	19

1 Product Overview

This product is an Easy Kit for MB95200 series. It is composed of an Easy BGMA and an Easy EV-board. Combining the SOFTUNE Workbench on PC, the Easy Kit enables the quick start of development before the user system is ready.

1.1 Objective and Deliverable

The Easy Kit provides users a simple development platform. Before using the Easy Kit, make sure that the following devices are ready:

- ✓ Easy Kit (FMCDC-MB95260H-EK-01) 1PCS
- ✓ Quick Start Guide 1PCS

User could download SOFTUNE and MB95200 Sample Code from the following address,

http://www.fujitsu.com/cn/fmc/services/mcu/mb95/index_mb95200.html

An USB extension cable (A-plug to A-jack) is optional if direct USB connection to PC is inconvenient.

1.2 System Block

To setup a debugging system, connect PC and an Easy Kit together as shown below:

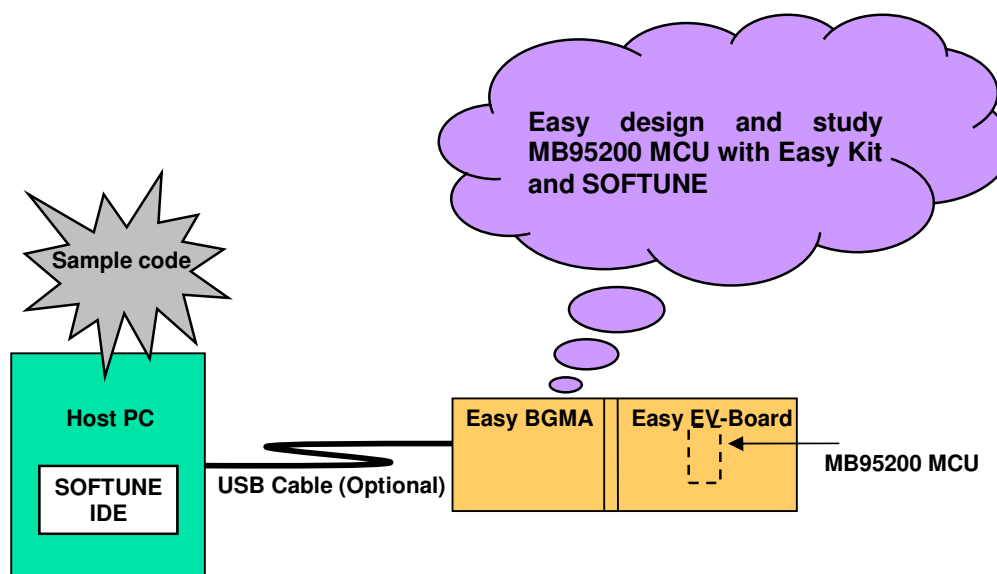


Figure 1.2-1 System Block

1.3 Handling Precautions

The Easy Kit can be used in connection with its bundled products. To ensure correct use of this product in a proper environment, observe the following guideline:

- Follow the instructions described in each manual for the bundled product to use this product.

1.4 Feature

The MB95200 Series Easy Kit is the best for a performance and functional evaluation, and a check of operation before including MB95200 Series MCU in a user's system.

Below, the feature of the Easy Kit for MB95200 Series MCU is shown.

- Microcomputer operation voltage. It corresponds to +2.7V to +5.5V.
(The maximum and minimum of microcomputer operation voltage and frequency of operation differs with each MCU. refer to the documents (a data sheet, hardware manual, etc.) of each device relation for the operation voltage and frequency of MCU of operation.)
- Compact development environment, a light and small Easy Kit.
- Since a monitor program is performed in exclusive memory space, it does not consume user memory space.
- Continuation execution, step execution and break correspondence.
- It connects with a host computer by the USB interface.

1.5 Hardware Setup

In the hardware setup procedure, you configure and connect the hardware products. This chapter includes the configuring and connecting procedure for each product in order. Check the contents and complete the hardware setup.

- Configuration of each product
 - Configuring Easy Kit
- Connection of each product
 - Connecting Easy Kit to PC

2 Easy Kit Manual

This chapter gives introduction how to setup Easy Kit.

2.1 Easy Kit Overview

Below is the close look of a MB95200 Series Easy Kit. The Part Number is FMCDC-MB95260H-EK-01. It provides a debug platform for the MB95200 Series MCU in a small size (85mm (L) X30mm (W) X10mm (H)).

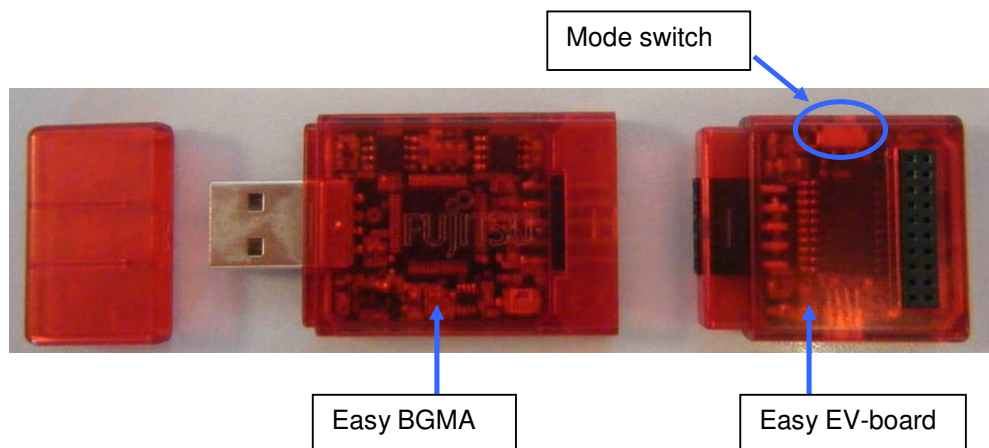


Figure 2.1-1 Easy Kit overview

2.2 Function List

ID	Function description	Remarks
1	Support MB95200 Series MCU	MCU MAX machine clock: 16.25 MHz MCU power voltage: 2.4 ^{*1*2} V ~ 5.5 ^{*1} V
2	Break pointer	256 software breakpoints
3	USB interface to PC/SOFTUNE	Compatible to USB protocol version 1.1
4	1-Line UART interface to the MB95200 Series MCU	The Baud rate is 62,500 bps
5	Support the MCU flash programming for engineering development	Flash operation at MCU rated voltage. The program and read speed is about 800 B/S.

*1: The value varies depending on the operating frequency, the machine clock or the analog guaranteed range.

*2: The value is 2.88 V when the low-voltage detection reset is used.

2.3 Easy Kit Interface Description

The Easy BGMA has five pins. Please check the table below for their definition. On board debug function will be easily realized by connecting the following 5 pins to target system.

Pin Number	Pin Name	Description
1	UVCC	Target MCU Vcc
2	DBG	Target MCU debug pin
3	GND	Target MCU Vss
4	RST	Target MCU reset input
5	5V	Power supply to Easy EV-Board

All the 20 pins of the MCU on Easy EV-Board are directly connected to the Easy EV-Board interface. Please check the table below.

Pin Number	Pin Name	Pin Number	Pin Name
1	X0/PF0	20	12/EC0/DBG
2	X1/PF1	19	P07/INT07
3	Vss	18	P06/INT06/TO01
4	X1A/PG2	17	P05/INT05/AN05/TO00/HCLK2
5	X0A/PG1	16	P04/INT04/AN04/SIN/HCLK1/EC0
6	Vcc	15	P03/INT03/AN03/SOT
7	C	14	P02/INT02/AN02/SCK
8	RST/PF2	13	P01/AN01
9	TO10/P62	12	P00/AN00
10	TO11/P63	11	P64/EC1

2.4 Easy Kit USB Configuration

Connect the Easy Kit to a PC USB interface. If the connection is right, the following window will pop up. Follow the instructions displayed, and then click “Next”,



Figure 2.4-1 Install Easy Kit in Windows (1)

Select “Install from a list or specific location (Advanced)”, then click “Next”,

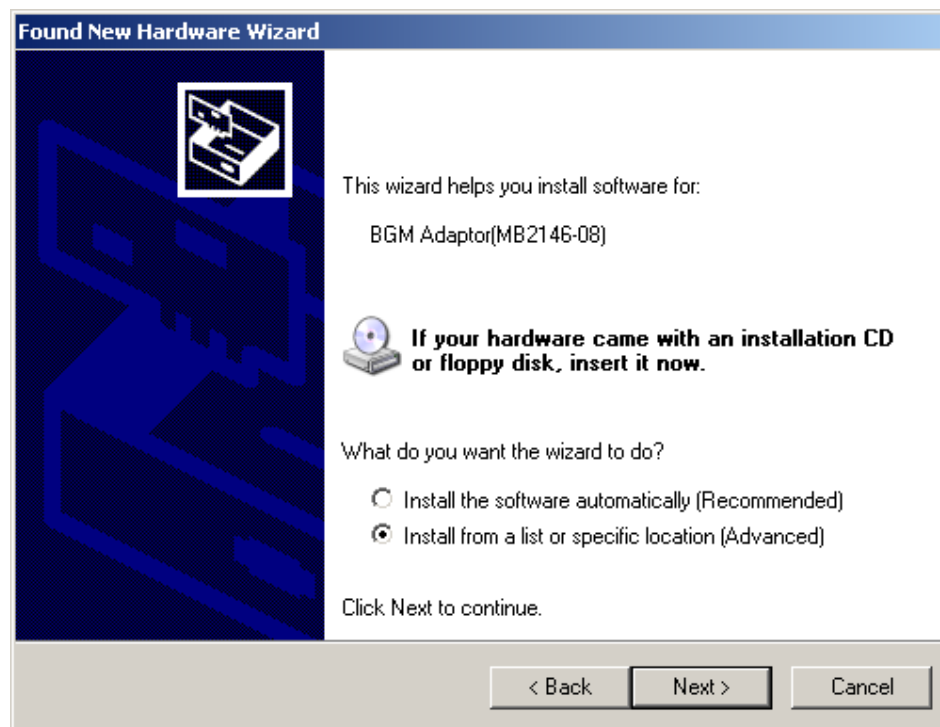


Figure 2.4-2 Install Easy Kit in Windows (2)

Select "...Drivers" from the folder where SOFTUNE is installed, click "Next",

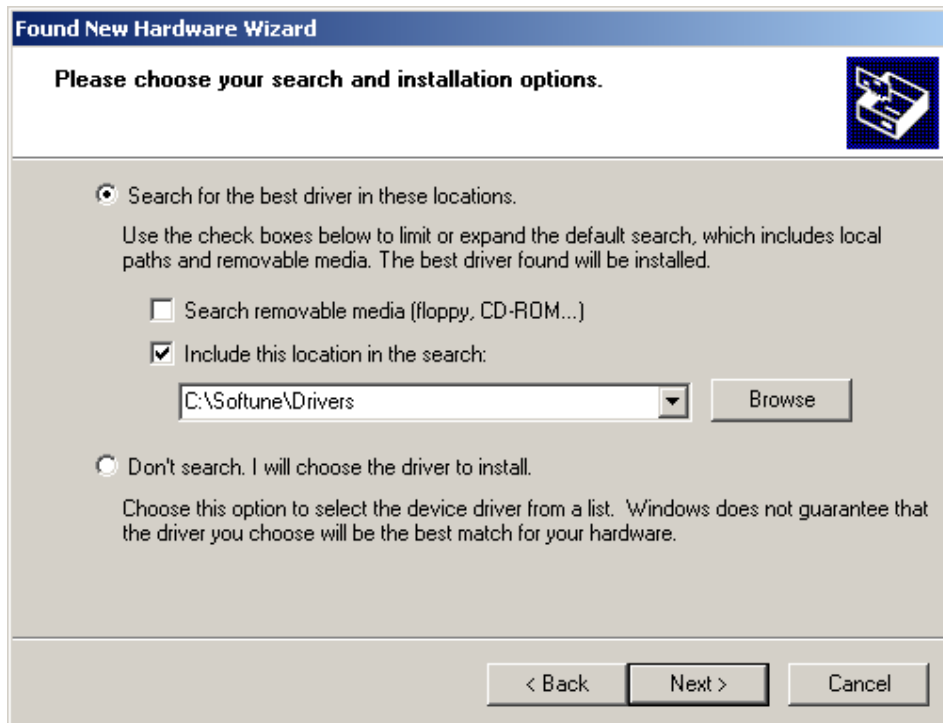


Figure 2.4-3 Install Easy Kit in Windows (3)

Select BGMA (MB2146-08) as displayed below, and then click "Next",

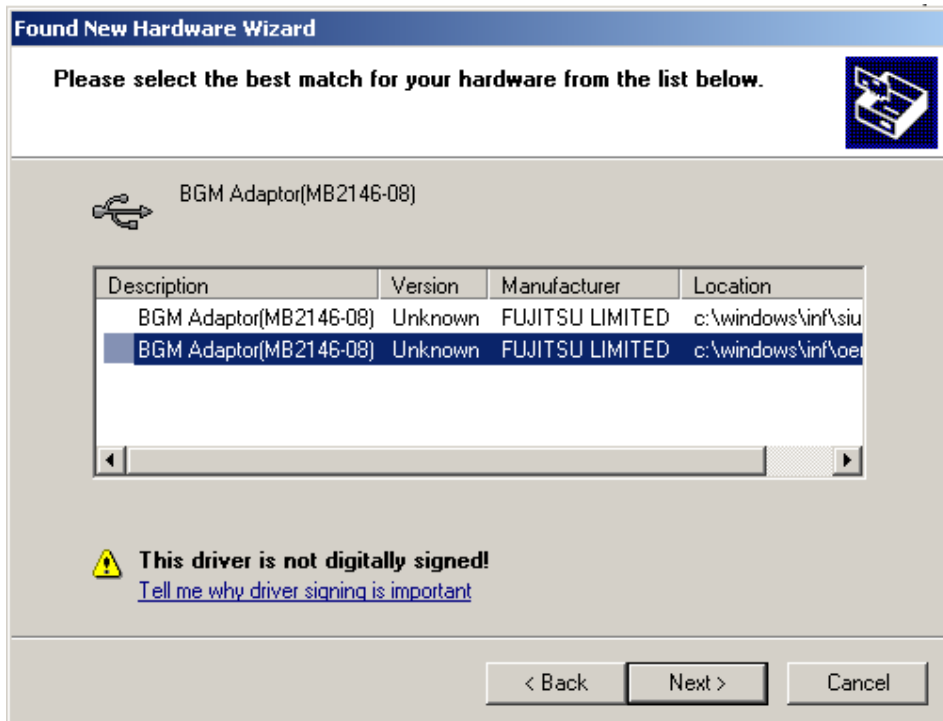


Figure 2.4-4 Install Easy Kit in Windows (4)

If the following window pops up during installation, please click “Continue Anyway” to complete the installation.

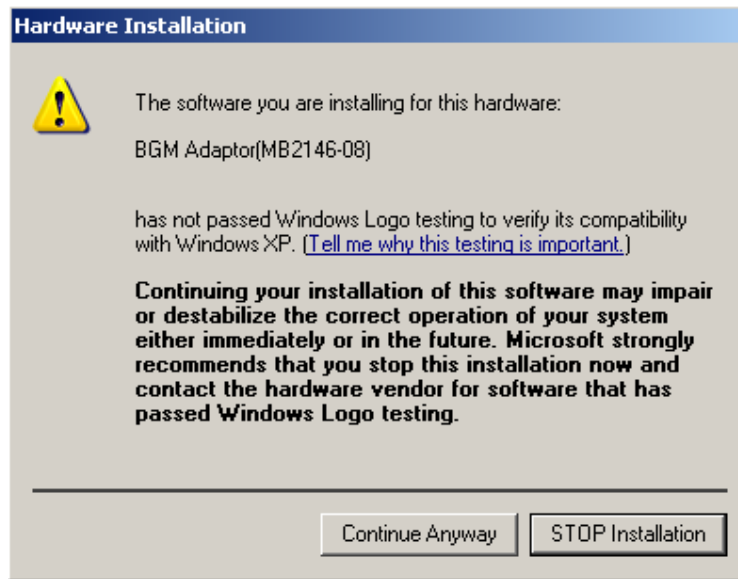


Figure 2.4-5 Install Easy Kit in Windows (5)

Windows will install the driver automatically. Click “Finish” after the driver has completed the installation normally. Then users can find the Easy Kit is recognized as “BGM Adaptor (MB2146-08)” in Windows system.



Figure 2.4-6 Easy Kit is installed in Windows

2.5 Easy Kit Mode Setting

A mode switch on Easy EV-Board is used to select Easy Kit between debug mode and free run mode. Check Figure 2.5-1 and Figure 2.5-2 below.

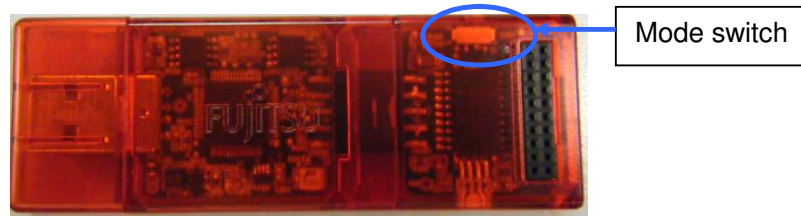


Figure 2.5-1 Mode switch from top view

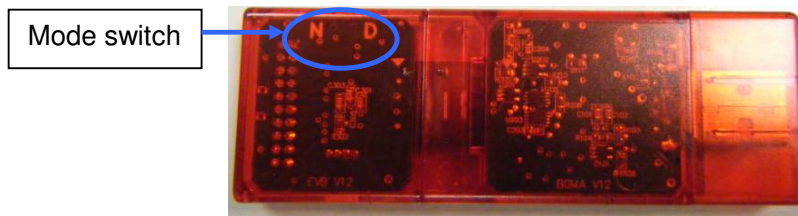


Figure 2.5-2 Mode switch from top view

Set mode switch on Easy Kit to debug mode as Figure 2.5-3. In this mode, after connecting the Easy Kit to USB interface, user could start debug in the SOFTUNE on PC.

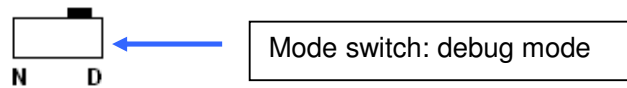


Figure 2.5-3 Easy Kit debug mode setting

Set mode switch on Easy Kit to free run mode as Figure 2.5-4. In this mode, the target MCU is in free run mode after connecting Easy Kit to USB interface.

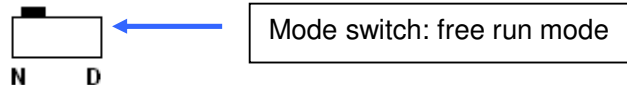


Figure 2.5-4 Easy Kit free run mode setting

3 Easy Kit Schematic

The Easy EV-Board schematic is shown as below,

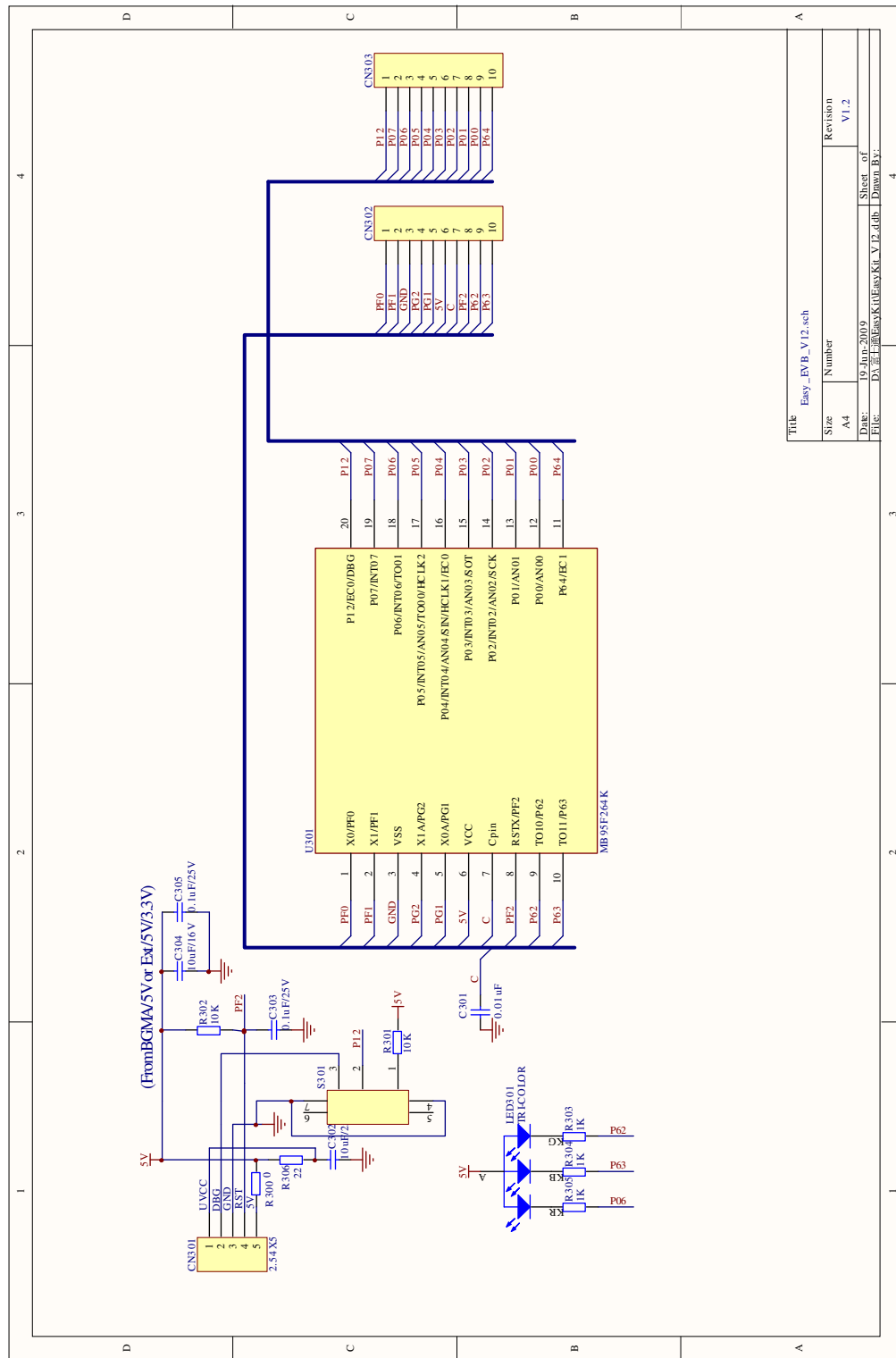


Figure 3-1 Easy EV-board Schematic

4 Sample Code Manual

4.1 Topic List

User could access the following address to get the SOFTUNE IDE and sample code for MB95200 Series Easy Kit,

http://www.fujitsu.com/cn/fmc/services/mcu/mb95/index_mb95200.html

4.2 Project Structure

Here take Easy Kit Demo project for example.

The Sample code is organized as Figure 4.2-1 in Windows system.

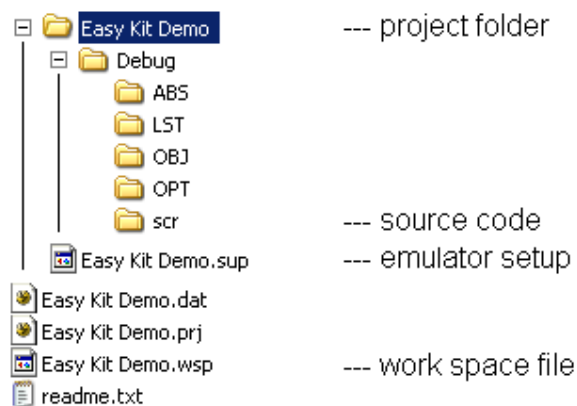


Figure 4.2-1 Easy Kit Demo Project Structure

It's recommended that user save all the source codes in one source code folder. In Easy Kit Demo project, folder "scr" is used. There are six files used in this project. They are shown as below,

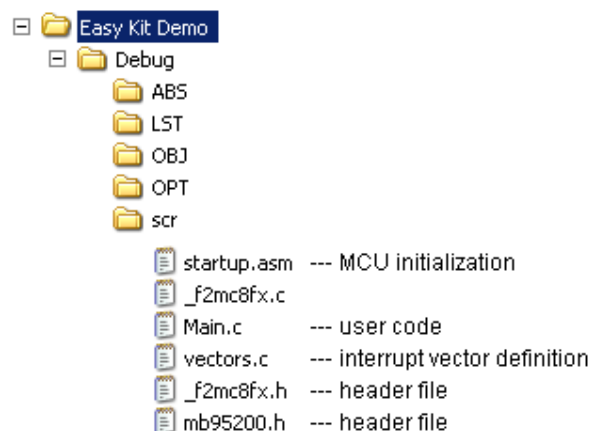


Figure 4.2-2 Source Code Files

4.3 Source Code File Description

In SOFTUNE, the structure is shown as Figure 4.3-1. After compiling successfully in SOFTUNE, user could easily identify source code and header files in this window.

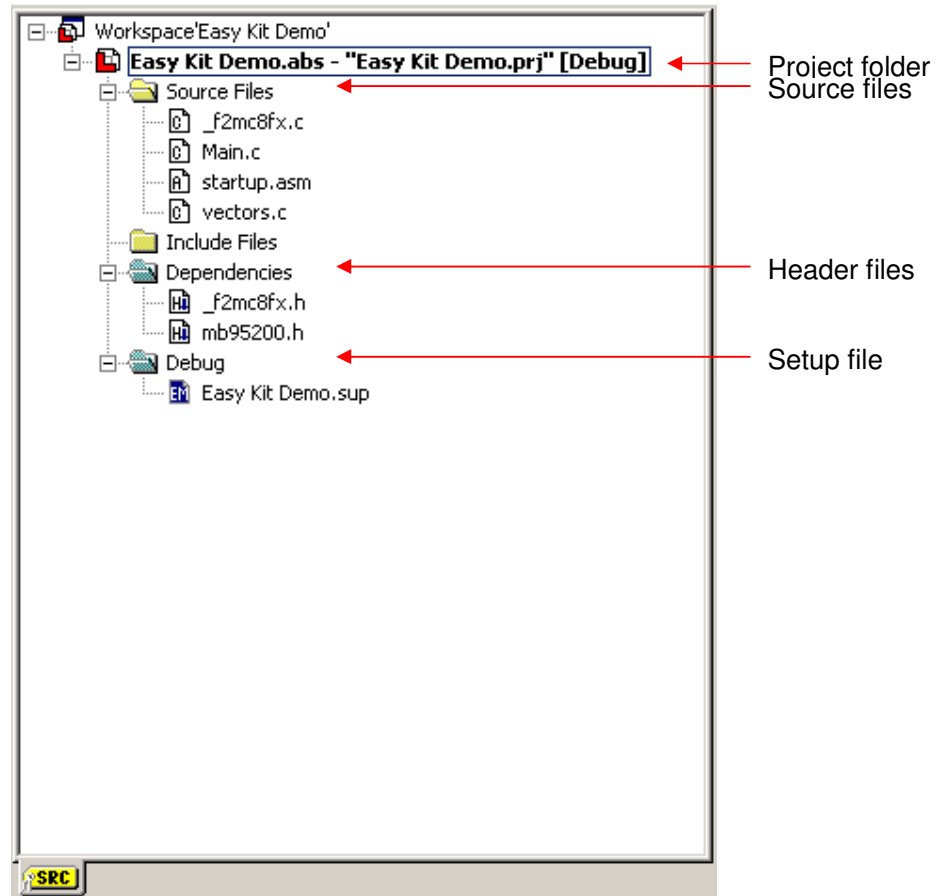


Figure 4.3-1 Project structure in SOFTUNE

4.3.1 Header Files

The MB95200.h and the _f2mc8fx.h are header files, including MB95200 Series MCU I/O registers definition;

Here take PDR0 for example. In MB95200.h, PDR0 is defined as below.

“

```
#ifndef __IO_DEFINE
#pragma segment IO=IO_PDR0, locate=0x0
#endif
```

```
typedef union {
    __BYTE    byte;
    struct {
        __BYTE    P00:1;
        __BYTE    P01:1;
```

```

        __BYTE    P02:1;
        __BYTE    P03:1;
        __BYTE    P04:1;
        __BYTE    P05:1;
        __BYTE    P06:1;
        __BYTE    P07:1;

    } bit;
    struct {
        __BYTE    P00:1;
        __BYTE    P01:1;
        __BYTE    P02:1;
        __BYTE    P03:1;
        __BYTE    P04:1;
        __BYTE    P05:1;
        __BYTE    P06:1;
        __BYTE    P07:1;

    } bitc;
} PDR0STR;

__IO_EXTERN    PDR0STR    IO_PDR0;
#define    _pdr0    (IO_PDR0)
#define    PDR0    (IO_PDR0.byte)
#define    PDR0_P00    (IO_PDR0.bit.P00)
#define    PDR0_P01    (IO_PDR0.bit.P01)
#define    PDR0_P02    (IO_PDR0.bit.P02)
#define    PDR0_P03    (IO_PDR0.bit.P03)
#define    PDR0_P04    (IO_PDR0.bit.P04)
#define    PDR0_P05    (IO_PDR0.bit.P05)
#define    PDR0_P06    (IO_PDR0.bit.P06)
#define    PDR0_P07    (IO_PDR0.bit.P07)
“

```

4.3.2 Startup.asm File

The Startup.asm is the MB95200 Series MCU initialization file including stack settings, register bank settings and watchdog settings etc;

4.3.3 Vectors.c File.

The Vectors.c contains the MB95200 Series MCU Interrupt vector definition.

User can pre-set all interrupt control registers in function InitIrqLevels(). It can be used to set all interrupt priorities in static applications. For example, to set the external interrupt ch.0 to level 0, change the following code:

```
ILR0 = 0xFF;    // IRQ0: external interrupt ch.0 | ch.4
                // IRQ1: external interrupt ch.1 | ch.5
                // IRQ2: external interrupt ch.2 | ch.6
                // IRQ3: external interrupt ch.3 | ch.7
```

To

```
ILR0 = 0xFC;    // IRQ0: external interrupt ch.0 | ch.4
                // IRQ1: external interrupt ch.1 | ch.5
                // IRQ2: external interrupt ch.2 | ch.6
                // IRQ3: external interrupt ch.3 | ch.7
```

And declare the interrupt function as in Vectors.c below,

```
.....
__interrupt void external_int00 (void);
.....
#pragma vect external_int00 0 // IRQ0: external interrupt ch0 | ch4
```

Then user can write his own interrupt sub-routine in Main.C shown as below.

```
/*----- INTERRUPT SERVICE ROUTINE -----*/
__interrupt void external_int00(void)
{
    //User code
}
```

4.3.4 Main.c File

Main.c contains the user code.

5 Development Platform Quick Start

5.1 Tools Setup Sequence

Start the debugging system in the following sequence:

- ✓ Select mode switch on Easy EV-Board to debug mode;
- ✓ Connect Easy Kit to PC USB interface;
- ✓ The Easy Kit will be recognized as “BGM Adaptor (MB2146-08)” in Windows.

5.2 Open Project and Start Debug

Users can start debug from SOFTUNE in the following sequence. Here take IO_LED project for example.

- ✓ Start the SOFTUNE from “Startup Menu>Programs> SOFTUNE V3> FPMC-8L Family SOFTUNE Workbench” in Windows;
- ✓ Click “Open workspace” from “File” Menu in SOFTUNE;
- ✓ Select “IO_LED.wsp” in “Open Space” window;
- ✓ Click “Start debug” from “Debug” Menu.

If the entire procedure goes right, a debug will start normally.

5.3 Operation Precautions

- ✓ All pins of MB95200 Series MCU are directly connected to Easy EV-board 20 pin interface. If the user wants to connect these pins out, it's recommended to add terminal resistors in series with the pins.

MCU-AN-500059-E-12

FUJITSU MICROELECTRONICS LIMITED • SUPPORT SYSTEM

F2MC-8FX Family MB95200 Series

Easy Kit

FMCDC-MB95260H-EK-01

SETUP GUIDE

Dec. 2009 the second edition

Published FUJITSU MICROELECTRONICS LIMITED

Edited Strategic Business Development Dept.

